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ANNALS OF NATURAL HISTORY;

OR,

MAGAZINE

OF

ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'MAGAZINE OF ZOOLOGY AND BOTANY,' AND SIR W. J. HOOKER'S 'BOTANICAL COMPANION.')

CONDUCTED BY

SIR W. JARDINE, BART.—P. J. SELBY, ESQ.,

DR. JOHNSTON,

SIR W. J. HOOKER, REGIUS PROFESSOR OF BOTANY,

AND

RICHARD TAYLOR, F.L.S.

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"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ: ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomia in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; a vere eruditis et sapientibus semper exculta; male doctis et barbaris semper inimica fuit."—LINN.

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ADVERTISEMENT.

The Second Volume of the Annals of Natural History being now completed, the Editors have the satisfaction of being enabled to state, after the experience of a year, that the support which their Journal has received from the public is at the least sufficient to give the full assurance of its permanent establishment. That which above all affords them the greatest encouragement is the quality and quantity of the contributions with which they have been supplied by valuable correspondents diligently employed in the observation of Nature. Thus aided, they are gratified at finding that their labours have begun to engage attention, not only in their own, but also in other countries. Already have some of the contents of this Journal been deemed worthy of being transferred into the pages of the Annales d'Histoire Naturelle ; whilst expressions of approbation and encouragement in the journals and correspondence of their contemporaries of Germany, Belgium, and the United States lead to the expectation that it will be increasingly useful as an established and

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ready medium of communication for the lovers of Natural History in all parts of the world.

The Editors must, however, be allowed earnestly to call upon all those to whom the success of such a Work may seem important, for their exertions to extend its sale, which though just sufficient to ensure permanence, and gradually on the increase, is still far short of that which its well-wishers might hope for. It can hardly be necessary for the Editors to state that their means of giving additional interest and value to these Annals, in various respects, must necessarily depend upon their having a greater sale than will merely cover the expenses of Publication.

P.S. It is hardly possible to speak of the difficulties with which Scientific Journals have to struggle in this country in comparison with all others, without adverting to the very heavy expense of Postage, and expressing our regret and mortification that nothing has yet been done by Government to relieve Science and Literature among us from a burthen so enormously oppressive.

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ERRATA.

Page 123, line 16, *for* this is *the* character *read* this is *a* character.
— 134, line 2 from bottom, for *Sterocles* read *Pterocles*.
— 135, line 1, for *Sternotherus Linneotus* read *Sternotherus sinuatus*.
— 138, line 5, *for* ciliatory *read* ciliary.
— 183, last line of text, *for* Platypalpus *read* Pachypalpus.
— 184, last line, *for* $\frac{3}{4}$ read $1\frac{3}{4}$.
— 250, line 3, *after* mandible *insert*, *beginning a fresh paragraph*, Young or nest plumage, like, &c.
— 263, 6 lines from bottom, *for* Beche *read* Beke.
— 268, line 13, for *Willoughbigii* read *Willughbeii*.
— 269, 270: the paragraphs relative to *Salmo ferox* and *Anguilla latirostris* should have been appended as notes after that on *Coregonus Pollan*.
— 286, line 23, *after* Archipelago *insert* under the name of *Cynogale Bennettii*.

ANNALS OF NATURAL HISTORY.

I.—*On some new Forms of* Arachnida. By W. S. MacLeay, Esq., A.M., F.L.S., &c.

[With Plates.]

WHILE I take shame to myself for never having fulfilled a promise made months ago to the 'Magazine of Zoology and Botany,' I hope to make up for past indolence by contributing my mite very frequently in future to its successor 'The Annals of Natural History.' In the mean time I shall be glad if any interest is excited by the novelty of the forms hereafter described. Four of them at least are very singular, and I have selected them as such out of a great variety of new forms in my cabinet.

M. Latreille has somewhere said that it would be difficult to discover a spider that cannot find its place in one of Walckenaer's divisions. The truth however is that naturalists as yet know but little of *Arachnida*. Leon Dufour, Koch, and even the distinguished Walckenaer himself, are acquainted with but few extra-European forms compared with the immense variety that exist. The great majority of species are inhabitants of warm climates, and being in general extremely difficult to preserve, they are therefore rare in our collections. Yet no Annulosa are more curious in their structure or perform more important functions in the œconomy of nature. My custom, when I was abroad, was to make sketches of the species while yet alive; which plan I recommend to naturalists as the only safe mode of studying these animals. The pencil is, for the entomologist, an instrument as necessary to wield as the pen.

I now place the following species before naturalists, in order to prove how little is as yet known of even that part of the class *Arachnida* which has been the most studied, namely, *Spiders**.

* For instance, not any one part of the definition given by Mr. Kirby (Int. to Ent. vol. iv. p. 397) to the *Araneidea* is correct, except that the

Four of these species will be sufficient to show that this interesting order has never yet been correctly marked out in any entomological work. I am not fond of giving insulated descriptions without an ulterior object in view; and therefore I may as well state that my aim now is to show that a true spider may have a distinct head,—that spiders may have an articulated thorax and abdomen,—that spiders may have only two eyes,—and that those which have eight may have them disposed in systems very different from any of the systems hitherto described,—finally, that although spiders in general have their labial palpi like feet, some species on the other hand may have their true feet like palpi and their labial palpi without ungues. Nay, were I to proceed to the other orders of *Arachnida*, I could exhibit facts equally extraordinary with respect to the whole class. For the present I shall merely say that my mode of distinguishing the order of *Araneidea* from other *Arachnida* is as follows:—

Head rarely distinct from thorax.

Antennæ of two joints, the last of which is a moveable corneous fang.

Labrum and *Mandibles* confluent with the tongue so as to form the oral orifice.

Maxillary palpi five-jointed.

Abdomen pedunculated; furnished at the base with two or four respiratory apertures, and at the extremity with a spinning apparatus.

Feet with the coxæ and tibiæ each of two joints.

Genus NOPS.

*Antennæ** small, not advancing from under the head, the first

abdomen is furnished with a spinning apparatus. Nor are the four characters given to the order by Walckenaer (Hist. Nat. des Ins. Apt. vol. i. p. 38) less liable to objection.

* Walckenaer asks what is the use of calling these organs *chelicera* or antennæ. The answer is, that if we give them the old name "mandibles," we are decidedly wrong; and that if we call them antennæ, we refer them to those organs of *Ptilota* with which they correspond by analogy of position. If we dissect a large *Nephila* when alive, we can easily perceive that these organs are not in the mouth, but separated from it by the labrum, which is under them, and not above them as Walckenaer erroneously says. The fact is, that the part which is called by Walckenaer the "bandeau" is not the true labrum, which is confluent with the mandibles, so as to form what the French call the "*languette*."

joint vertical, short, subconical, with the second joint or fang small, curved, acute, and of the same colour as first joint.

Eyes only two, placed close together towards the fore part of cephalothorax.

Maxillæ conspicuous, subquadrate, bent round the mentum and having their apex obliquely truncated.

Maxillary palpi having the first joint very short, the second joint obconical and elongate, the third short and bent, the fourth straight, obconical, and longer, the fifth or last thick, oval, and hirsute.

Labial palpi pediform with seven joints.

Mentum separated from the sternum by a transverse furrow; longer than broad with its frontal edge semicircular.

Head not distinct from thorax. *Cephalothorax* subtranslucid with convex back without hair, obovate, narrowing gradually towards the front, which is rounded. Its tegument is subcrustaceous, while that of the abdomen is membranaceous. This *abdomen* is a prolate spheroid terminated by six spinners of which two are inconspicuous and two are very prominent. *Sternum* twice as long as broad, oval, flat, and crustaceous. *Feet* like the labial palpi translucid; the penultimate pair being the shortest. *Ungues* short, pectinated at base. If there be a third unguis it is evanescent.

Sp. 1. Nops guanabacoæ.—*Nops* sanguineo-rubra, palpis maxillaribus articulo ultimo crasso obscuro hirsuto pilis canescentibus; cephalothoracis macula oculifera parva nigra, pectore punctato plano; abdomine obscuro hirto, fusulis pallidioribus; pedibus versus apicem hirtis; unguibus nigris.

Long. 5 lin.

The trivial name of this remarkable spider will serve to commemorate Guanabacoa, the place where first I found it, a place in which I long resided, devoting many delightful hours to the science of natural history. The genus *Nops* is easily known from all other spiders hitherto described by having only two eyes. These are round, black, and when alive very brilliant; but they have no iris. In the species *Nops Guanabacoæ* they are set in the middle of a black spot, which is on the fore part

of the egg-shaped cephalothorax. The sternum has vestiges of those eminences at the base of the feet which distinguish *Ariadne* and certain American forms of *Dysdera*. This spider has only two pulmonary pouches; or if it has four, the additional ones are very small. It is common under stones in woods; and occurs also, although more rarely, in houses. I have never seen it making a web, so that in this respect it agrees with some of the *Drassi*. In fact, it connects the *Dysderina*, such as Savigny's subgenus *Ariadne*, with certain *Drassina*, such as Savigny's subgenus *Lachesis*.

The *Dysderina* form a curious group. In them not only have we the eyes varying in number, two, four, six, or eight, but the organs of manducation are in some species rudimentary, and in others excessively developed. I possess specimens of a translucid West Indian spider closely allied to *Filistata*, and having Mygalidous eyes situated on the balloon-shaped cephalothorax of a *Nops*. In these specimens the antennæ, maxillæ, &c. are so rudimentary and inconspicuous as would almost make us doubt that the species can be an animal of prey, did we not find it making an irregular web in the corners and crevices of houses. I call it *Hemerachne tenuipes*; and on viewing it we can the better understand how *Nops* and *Ariadne* should have small antennæ, while *Dysdera erythrina* has these organs so large.

I place *Nops* among the *Dysderina*, and not among the *Drassina*, on account of its hard tegument; for the *Drassina* in general have this very tender, and thus we see *Clubiona* and other comparatively delicate genera not only to form the food of *Hymenoptera* like *Pelopæus*, but even of *Diptera*. I have caught various species of *Asilidæ* in the act of devouring these tender-skinned spiders, so that if certain spiders live on flies, there are also certain flies that feed on spiders. But to return to *Nops Guanabacoæ*, the figure I give of it was drawn by Mr. Charles Curtis from a dried specimen in my cabinet, and coloured from a sketch made by me in Cuba of the live animal. I possess another species of the genus which has no black spot on the cephalothorax.

I take this opportunity of saying that I shall be glad to exchange specimens of *Nops* for specimens of the genus *Artema*,

Walck., or *Tessarops*. *Tessarops* is a genus described by Rafinesque in the 'Annales des Sc. Phys. de Bruxelles,' and to which some doubt is attached. Although I have no hesitation in admitting that spiders may occur with four eyes as well as with two, six, or eight; still the magnified hind leg as figured by Rafinesque, and other circumstances connected with the peculiar character of the author, make me agree with Latreille in considering the existence of *Tessarops maritima* as extremely apocryphal. If any such being exists, I suspect it will be found to have been most incorrectly described. At all events, I cannot believe it properly placed by Latreille among the saltigrade spiders; nor do I think it can on the other hand be very nearly allied to *Nops*. It seems, if I may be allowed to found a conjecture upon a figure so bad and a description so lame as those of Rafinesque, to be more closely connected with a singularly flat and minute hard-shelled six-eyed spider with a sessile abdomen, which is to be found in Cuba among old papers and in boxes of insects, and which passes off directly to the *Acaridea* or order of mites. I have called it *Sclerachne*; for its tegument is even more hard in proportion to its size than that of the genus *Gastracantha* of Hahn, or any of the cancriform *Epeïridæ* which form Walckenaer's genus *Plectanus*.

Plate I. Fig. 1. *Nops Guanabacoæ* magnified.

Genus SELENOPS, *Dufour*.

Antennæ short, with the first joint subconical, and the second joint or fang hooked and sharp.

Eyes eight, six of which are placed in a semicircle with the arch convex forward, the two lateral ones being the largest and rather further removed from the intermediate four than these are from each other. The remaining two eyes, which are the least of all, are anterior, placed one on each angle of the head and nearly on the same line with the two middle ocelli of the semicircle.

Maxillæ straight.

Maxillary palpi having the first joint very minute.

Labial palpi pediform and seven-jointed.

Mentum rounded at apex.

Head not distinct from thorax. *Body* very flat on the ground with the legs also extended flat on the same surface. *Abdomen* soft with six fusi.

Of the genus *Selenops* Walckenaer gives three subgenera, *Omalosoma*, *Apharteres*, and *Aissus*. Near to the latter comes the following additional form of *Selenops*, which I shall call *Hypoplatea*.

Subgenus Hypoplatea.

Antennæ with two teeth on the inner side of the groove of first joint.

Eyes, the two lateral ones of the arch rather oval in form.

Maxillæ subparallelogrammic, being obliquely truncated at the inside.

Maxillary palpi having their terminal joint the longest and crowned with an unguis.

Mentum semicircular.

Sternum suborbicular, but posteriorly emarginate.

Abdomen as wide as the cephalothorax.

Feet, the last pair but one the longest. *Tarsi* having a cushion surmounted by two very minute ungues.

Sp. 2. Hypoplatea celer.—*Hypoplatea* flavescenti-grisea, abdomine fascia apicali nigra emarginata terminato; ad basin tripunctato, punctis inter pilos ochreo-flavos nigris; femoribus trifasciatis fascia media fulva utrinque nigra fasciis externis nigris; tibiis subfasciatis.

Long. 6½ lines.

This species is common in Cuba, darting in the rainy season with extreme velocity over the plastered floors. Its body and legs are extended so flatly on the surface on which it moves, and moreover it has the Thomisidous faculty of running backwards so strongly developed, that it is sure, along with various little lizards of the subgenus *Sphæriodactylus*, to attract the attention of new comers, when, owing to certain qualms inside and torrents of rain outside, they shut themselves up in their apartments to ponder gloomily over the novelties of a West Indian climate. I possess other species of the genus, but which belong to Walckenaer's subgenus *Aissus*, and which are only to be found on the trunks of trees. These are seen like a ray of light to flash before the entomologist when they have been dislodged by his stripping off the

bark in search of insects. The difference between the West Indian subgenera *Aissus* and *Hypoplatea* is that in the former the first pair of feet are the longest, whereas in *Hypoplatea* it is the penultimate pair; besides in *Aissus* the two large lateral ocelli are round, in *Hypoplatea* they are oval. The mentum of *Omalosoma*, another subgenus of *Selenops*, is not truly semicircular, nor does that kind of spider lie so broad and flat on the ground as *Hypoplatea*. In general aspect *Hypoplatea* bears great resemblance to the genus *Artamus* of Koch, but differs from it altogether in the disposition of the eyes. *Thanatus*, Koch, *Artamus*, Koch, *Selenops*, Duf., *Philodromus*, Koch, and *Olios* of Walckenaer (which last is identical with Koch's *Ocypete*, a name that cannot stand as it has been elsewhere employed), all form a group of laterigrade spiders which perhaps are the swiftest of the whole order. They lie in wait for their prey like the saltigrade spiders and those other laterigrade spiders of which *Thomisus* is the type; but instead of leaping on their food like *Thomisus*, they catch it by their extreme velocity in running. They differ thus also from the *Lycosina*, which regularly hunt down their prey*; and I may take this opportunity of observing that Koch makes a gross mistake in placing Walckenaer's genus *Ctenus* among the *Krabbenspinnen*. *Ctenus* is not a laterigrade spider, but has all the habits and structure of the *Wolfspinnen*, as I know by personal experience, the genus being very common in Cuba. Latreille is also wrong in calling the *Wolfspinnen* "citigrades" *par excellence*, for they are far less swift than the present group.

I have introduced *Hypoplatea* in this place, not so much from the form being new to science, as in order to show the proper mode of considering the ocellar system of spiders when we are investigating their affinities. *Thanatus* and *Artamus* have nearly the typical system of ocelli which prevails throughout the greatest part of the laterigrade spiders, of which it may be said that the arch of their eyes is typically convex outwards in opposition to that of the *Drassina*, where

* On this account Walckenaer is wrong in placing the genus *Oxyopes*, Lat., or his own *Sphasus* among the *Lycosina*. I have always found these *Oxyopes* on syngenesious flowers sedentary like *Thomisi*. One large green species of *Oxyopes* is common in Cuba. I call it *O. floricola*.

the arch is typically convex inwards. Now the *Thomisidæ* in general may be said to have their eight eyes disposed, four and four, in two concentric arches, of which the curve is convex in front. The four ocelli of the inner arch remain pretty nearly in all the *Thomisidæ* at equal distances from each other: so also do the four of the outer or front arch in *Artamus*. In the nocturnal genus *Olios*, of which the type is the *Aranea venatoria* of Linnæus and the manners very singular,* the convexity of the front arch is scarcely to be detected. In the aberrant genus *Thanatus*, which is close to *Ocyale* and *Dolomedes*, it is more visible. In *Philodromus* of Koch we see the four front eyes going two and two to each side of the head. In the genus *Selenops* the anomaly is at the extreme, so as to place the outer edge of what is ordinarily the front arch in the curve of the inner one and the other eyes a little lower. Thus in the subgenus *Hypoplatea* there are six ocelli in an arch convex outwards and two others in front, one at each corner of the head. The sketch of *Hypoplatea celer* was taken by me from the animal immediately after death.

Plate I. Fig. 2. *Hypoplatea celer* magnified. α, system of eyes; β, mentum, maxilla and maxillary palpus; γ, sternum.

Genus DEINOPIS.

Antennæ proceeding vertically downwards nearly in the same plane with the two large eyes. First joint subquadrate, the second joint or fang closes inwards.

Eyes eight, two dorsal and six frontal; of these last two enormously large black, shining, spherical eyes occupy the half of the front. Under these in the middle are two very minute ocelli; and two others also small are placed below, one on each, outside of the large eyes, but not on the same vertical plane with them, for these last two small ocelli are somewhat lateral.

Maxillæ subquadrate, thick, and diverging from the mentum.

Maxillary palpi with the first joint somewhat dilated; the others cylindrical, nearly equal, excepting the last, which

* Walckenaer is in error when he says that this genus feeds on lizards. I believe that no spider lives on Vertebrata. *Thomisus morbillosus* of the Appendix to King's Survey of the Intratropical Coasts of New Holland belongs to the genus *Olios*.

is subovate and terminates in a very minute unguis in the female.

Labial palpi seven-jointed and pediform; but differ from the feet not only in being longer, but also in the joint corresponding with the femora, which is stouter and emarginate at the base. This joint moreover is furnished nearly half-way on the inside with curved setæ. The last joints of the labial palpi are also thicker than the corresponding tarsi of the true feet, and their basal joint is indistinct.

Mentum separated from the sternum by a transverse furrow, longer than broad, restricted in the middle, and having a semicircular apex.

Body slender, more than five times as long as broad. *Head* confluent with body. *Cephalothorax* convex in front, and as broad as abdomen, behind broader and depressed. The cephalothorax above presents an anterior elevation in the form of a pentagon, which is the true head; the base of the pentagon being the front of this head, which is truncated in front, rounded off at the sides, and canaliculated longitudinally in the middle, while each of the lateral posterior angles of the pentagon supports a small black eye. The head from the base of the above-mentioned pentagon is perpendicularly truncated, and thus presents a vertical face, in which are situated the other six eyes.

Sternum of three distinct segments.

Abdomen more than twice as long as the rest of the body, subcylindrical, only gradually tapering towards the point. *Fusi* inconspicuous. *Feet* slender, of which the first pair is longer than the third, and the third pair than the second, all being long and slender, and having inconspicuous ungues.

Sp. 3. Deinopis Lamia.—*Deinopis* villosa grisea; capite medio lineis duabus ochraceis obscuris; sterno vitta nigra lata utrinque instructo; abdomine punctis quatuor minutis nigrescentibus basalibus, maculisque duabus versus medium nigris; pedibus maculis nigrescentibus variegatis.

Long. 5½ lines.

One of the distinguishing characteristics of the class *Arachnida* is the disposition of the segments of their body to become confluent. Even when, as for instance in the scorpions, the

segments are in general distinct, the head remains confluent with the thorax. In general the dorsal segments have this disposition to become confluent more strongly than those of the under side; and thus in the cancriform *Epeiridæ* we can detect the vestiges of articulation on the under side of the abdomen, and in *Deinopis* on the under side of the cephalothorax. But what makes the present spider above all others interesting is the position of the eyes, which are remarkably unequal in size. Two of them are dorsal as usual, but the other six have a rather novel situation, not being visible when we look on the back of the insect. The head, being truncated in front, presents, like that of certain saltigrade spiders, or rather like certain Crustacea, a vertical face. Half of this face is occupied by two enormous black eyes, set in blood-red circular rims*, which touch each other laterally, and form irides that give our spider a most truculent aspect. This curious system of eyes may, however, be easily approximated to that of *Ctenus*, if we make no account of the truncation of the head. I found *Deinopis*, with the last-mentioned genus and *Dolomedes*, under stones in the island of Cuba. It must be assigned to the *Wolfspinnen* of Koch, but it is very unlike any of them hitherto known. My drawing was made from it while yet alive. I never found the male.

Plate II. Fig. 3. *Deinopis Lamia*, magnified. α, front and vertical view of head; β, sternum, mentum, maxillæ, and a maxillary palpus.

Genus MYRMARACHNE.

Antennæ twice as long as head, with the first joint thick, exserted, subtrigonal, plane above, and armed beneath and on the inside with six minute spines; the second joint or fang long, slender, sinuated, and very sharp at the point.

Eyes eight, disposed as in *Attus*.

Maxillæ short, straight, dilated and rounded off at their extremity.

Maxillary palpi having their first joint small; the second obconical, subtrigonal, and thrice as long as the third; the third, fourth and fifth forming an obconical club, of which

* This fact proves the affinity of *Deinopis* to the *Lycosina* and Saltigrade spiders, where the two largest ocelli of the eight may be seen to have the pupil, as it were, surrounded by a coloured iris as in Vertebrata.

the former is the shortest joint, and the last is by far the thickest, being truncated and concave at the apex.

Labial palpi pediform and 7-jointed, only the basal joint is evanescent.

Mentum oval, elongate.

Body with a subcrustaceous tegument. *Head* distinct from thorax though soldered to it; quadrate and convex on the upper side, where the eyes are placed. *Thorax* ovate, narrower and longer than the head, and convex also on the upper side. *Abdomen* subarticulate, arched, pedunculated at the base, swelling in the middle, with a convex back and dilated margined sides, and then terminating in a spindle; the peduncle before mentioned being slender, cylindrical, and longer than the head. *Feet* are like the labial palpi, but the two first pair are somewhat shorter. *Ungues* not very conspicuous.

Sp. 4. Myrmarachne melanocephala.—*Myrmarachne* capite nigro; antennarum articulo primo rufo basi flavo; palpis maxillaribus brunneo-nigris; thorace abdominisque pedunculo rufis; abdomine nigro; palpis labialibus pedibusque piceis.

Long. 4½ lin.

This handsome spider is a native of Bengal, and I present a figure of it, made by my friend Mr. C. Curtis, in order to show the relation which it bears to the American subgenus, called *Myrmecium* by Latreille. *Myrmarachne* is even still more like than *Myrmecium* to an ant or *Mutilla*. Its hard corneous envelope, its distinct head, the long peduncle of its abdomen, and its insected body, all tend to aid the deception in the most striking manner. It evidently comes between *Attus formicoides*, Walck., and *Myrmecium rufum*, Lat. It has the eyes of the former spider, except that the two smallest and middle ones are not placed at the margin of the head. With the latter spider it agrees in the head being even still more perfectly distinct from the thorax, as well as in the abdomen being subarticulate. *Myrmecium*, however, in its eyes, approaches, as Walckenaer observes, to *Dolomedes*, while the antennæ are short and of an ordinary form.

In *Myrmarachne melanocephala* the antennæ are long, stout, and the first joint has a tubercle on the upper side of its apex, and its whole plane upper side is transversely striated. No-

thing is certainly known with respect to the manners of these curious spiders, but I suppose, from analogy, that they may eventually be found to feed on ants. It has been long known that the *Volucellæ* in their larva state live in the nests of the *Bombi* they so much resemble; and I have discovered that the larvæ of those tropical *Bombylii* which have such a bee-like form live on the larvæ of the bees they so strikingly represent. Perhaps, in like manner, the object of nature in giving such a striking form to this spider is to deceive the ants on which they prey.

Attus of Walckenaer is a very good subgenus, if the name be confined to such ant-like insects as *Aranea formicaria* of DeGeer, and *Attus formicoides* of Walckenaer. Latreille's name, *Salticus*, ought therefore to be confined to those saltigrade spiders of which the *Aranea scenica* of Linnæus may be considered the type. This, however, is an use of the two generic names the very reverse of that which is proposed by Sundevall in his description of the spiders of Sweden.

Plate I. Fig. 4. *Myrmarachne melanocephala*, magnified. α, system of eyes; β, antenna; γ, abdomen viewed laterally.

Genus OTIOTHOPS.

Antennæ short, having the first joint transversely vertical, subcuneiform, and the second joint or fang minute and horizontal.

Eyes eight; the four frontal ones disposed in a transverse line, of which the two on the outside are the least and suboval; behind these last there are two other eyes placed small and round; and the remaining two are in the middle between them only placed further behind; these two are so confluent that to the naked eye the spider seems to have only seven ocelli. (In my specimen the right ocellus is evanescent, and the left is very large and of a silvery lustre.)

Maxillæ large, subtriangular, truncated at the apex, and having the palpi inserted at their very base.

Maxillary palpi with the penultimate joint short, and the last one long, triangular and hirsute.

Labial palpi vertical, not pediform, six-jointed; first joint curved, thick; second semilunar, much incrassated; third

obconical and less; fourth and fifth simple, the latter shortest, and both armed on the outside with a brush, while the last joint is appendiculated, pyriform, and at the base on the side provided also with a brush.

Mentum separated from the sternum by a transverse furrow, elongate, triangular, with a rounded point, and subarcuated in the middle.

Body thickish and convex. *Head* confluent with the thorax. *Cephalothorax* very convex above, narrower before and behind, rounded in front and truncated behind, with convex sides. *Abdomen* a prolate spheroid, with a hairy membranaceous tegument. *Fusi* six, two being very minute. *Breast* plane, the segments being confluent. *Feet* dissimilar, that is, the two last pair are very different from the first pair. These are thicker, darker-coloured, and have the penultimate joint on the inside armed with a brush of hairs. The ungues of the feet are only two, which are inconspicuous, except when greatly magnified*.

Sp. 5. Otiothops Walckenaeri.—*Otiothops* cephalothorace glabro palpisque labialibus castaneo-brunneis; pedibus brunneo-testaceis; abdomine nigro hirsuto.

Long. 5 lin.

This hard-skinned spider comes close to the genus *Chersis* of Savigny, or *Palpimanus* of Dufour. The eyes, however, here are totally different, and, moreover, very remarkable from the confluence of the two hinder ones. Another singular character is the first pair of feet, which are palpiform, and different in structure from the two last pair; thus demonstrating how in *Arachnida* true feet may become palpiform in the same way as, more ordinarily, true palpi become pediform. The conversion of the organs of the mouth into organs of locomotion, and again of true feet into organs of manducation, is a singular characteristic of certain apterous Annulosa. *Otiothops*, like *Chersis*, has strong points of affinity to the saltigrade spiders. Our specimen is a female.

Walckenaer, as an essential character of spiders, lays stress on what he calls the eight feet, that is, the labial palpi and

* Their structure, highly magnified, is figured by Walckenaer in his beautiful work, tab. 10.

six true feet, being unguiculated. Here, however, as in *Chersis*, the labial palpi have no ungues at their extremity. Moreover, these labial palpi have only six joints; differing from those of spiders in general, which have seven.

I have named the species after my old and very distinguished friend Baron Walckenaer, to whom we owe so much of our knowledge of *Arachnida**. *Otiothops Walckenaeri* is found under stones in the woods of Cuba. My sketch is from the life.

PLATE II. Fig. 5. *Otiothops Walckenaeri*, magnified. β, disposition of eyes; *B*, sternum; *c*, first joints of coxæ; ε, first joint of labial palpi; ζ, labial palpi; θ, mentum; γ, maxilla; δ, maxillary palpus; α, base of antenna; σ, abdomen; ω, fusi.

II.—*On Fishes new to Ireland.* By WILLIAM THOMPSON, Esq., Vice-President of the Natural History Society of Belfast.

[Continued from Vol. I. p. 359.]

MOTELLA GLAUCA, Jenyns, Mackerel Midge.—Two minute specimens—the larger $1\frac{3}{4}$ inch long—of *Motella* that I have closely examined, and which were obtained at the South islands of Arran (off county Clare), by R. Ball, Esq., in June 1835, agree in every respect with the *Ciliata glauca* of Couch, described in the Magazine of Natural History, vol. v. p. 16; at the same time I cannot perceive any specific difference between them and *M. Mustela.*

PHYCIS FURCATUS, Flem., Common Fork-beard.—To Cortland G. M. Skinner, Esq., of Glynn Park, Carrickfergus, I am indebted for a remarkably fine specimen of this fish, which was kindly secured for me on its being stated by the fishermen who captured it to be a species quite unknown to them. It was taken on February 24, 1836 (a calm day), with a gaff or hook, as it "lay floundering" on the surface of the water; was very violent when brought on board, and before dying had struggled so hard as to divest itself of nearly all its scales.

* I wish, however, that in his excellent volume on Apterous insects in the 'Suites de Buffon' he had not been so fond of changing names. Surely Walckenaer can afford to despise the petty credit of assigning a generic name.

The discrepancies of authors relative to the *Phycis furcatus* induce me to add the following description of this individual: length 25 inches; greatest depth of body $6\frac{1}{2}$ inches; weight $6\frac{1}{2}$ lbs. With Cuvier's short description (Règ. An. t. 2. p. 335), and which is adopted in the 'Manual of British Vertebrate Animals,' it agrees in only one of the three specific characters, that of the first dorsal being more elevated than the second. Its 3rd D. ray is longest *, being 3 inches in length, and terminating in a filament; the 2nd ray is 2 inches, and the first but 10 lines long. Upper jaw much the longer; ventral fin, from base to extremity of the longer fork, $7\frac{3}{4}$ inches; to that of the shorter, $5\frac{1}{2}$ inches. Head 5 inches 10 lines long, nearly as one to four in length of body; P. fin rather more than half the length of the head, and central between the dorsal and ventral outline; profile rather angular from D. fin to eye, above which it is a little depressed; eye exceeding an inch in diameter; nostrils double, 3 lines apart; beard very slight, 1 inch 2 lines long; 2nd D. and A. fins increase gradually in breadth posteriorly, at their termination cut square, or at right angles to the body; no spines before the A. fin as in those described by Mr. Couch (Linn. Trans., vol. xiv. p. 75); tail obscurely rounded; lateral line much incurvated for two-thirds its length anteriorly; vent $10\frac{1}{2}$ inches from snout; "jaws and front of the vomer armed with several rows of sharp card- or rasp-like teeth."

D. 9—64; A. 54; P. 17 (6th longest); V. 1; C. 24, reckoning all; Br. 7.

Colour of body lilac grey, becoming paler towards the belly; D. A. and C. fins lilac grey, terminated with black; P. fin dark grey; V. fin greyish, towards extremity white; interior of gill covers rich purple; eyes silvery round the pupil, thence to circumference brown.

On dissection it proved a male, the milt weighing $11\frac{1}{4}$ oz. The stomach contained some crustacea and two small whitings (*Merlangus vulgaris*).

Since the above was written, I have learned that a specimen

* The error of Pennant and Cuvier in considering the 1st D. ray the longest may perhaps be attributed to a want of due examination, as otherwise it does so appear, and more especially in a dried specimen.

taken about the same place occurred to the late Mr. Templeton (Mag. Nat. Hist., vol. i. p. 411, New Series). The species should consequently have been omitted as an unrecorded Irish one; but as a description was drawn up, and specimens had not come under the inspection of either Yarrell or Jenyns previous to the publication of their respective works, it has been considered better with this notice to retain it.

Platessa Pola, Cuv., Pole.—On April 26, 1837, I procured, in Belfast market, six specimens of this fish, which had been taken along with turbot, &c. at Ardglass, on the coast of Down. Such is the difference in the number of rays in their fins, especially in the anal, that it seems to me desirable to be noticed at full length.

No. 1.	Length 14¾ inches;	D. 102;	A. 89;	V. 6.	
2.	,, 14½ ,,	102	88	6	
3.	,, 14¼ ,,	108	92	6	
4.	,, 13½ ,,	110	100	6	
5.	,, 13 ,,	102	86	6	
6.	,, 12 ,,	106	91	6	

No. 1.	P. 12	on upper, 10 on under side;	C. 19 à la Cuv., or 23 altogether.			
2.	12	,, 10 ,,	19	,,	23	,,
3.	11	on each side	19	,,	23	,,
4.	11	,,	19	,,	25	,,
5.	12	on upper, 10 on under side;	19	,,	23	,,
6.	11	,, 10 ,,	19	,,	22	,,

Branchiostegous membrane in each specimen consisting of five rays; in each likewise a short strong bony spine, directed forwards before the anal fin, but which cannot be called a spinous ray: in some individuals the skin covers it, in others the point is exposed.

With the short specific characters in the 'Manual of British Vertebrate Animals' these individuals agree, with one exception, that of the lateral line not being "straight throughout its course," although it is nearly so—from the origin it slopes gently over the pectoral fin, and thence to the tail is straight. They correspond in every detail with the general description in the same work, except in the following particulars, in which the specimens exhibit considerable difference. Mr. Jenyns remarks, "greatest elevation of the [dorsal] fin contained five times and a half in the breadth of the body,"

p. 459—in some of these it is contained but $3\frac{1}{2}$, in others 4 and $4\frac{1}{2}$ times, and this is not owing to difference of size in individuals; in the female specimen, which is of the largest size, the dorsal fin is rather lower compared with breadth of body than in the others. In the individual examined by Mr. Jenyns, the ventral fins are described to have equalled the pectorals in length, but in all these the latter are considerably longer, in some being one-third, in others one-fourth longer than the ventrals. With Mr. Yarrell's description they generally agree.

The *colour* of the upper side of these six specimens is one uniform tint, intermediate between the "yellowish brown" and "wood brown" of Syme's 'Nomenclature of Colours.' The fins are all merely of a darker shade, owing to the membrane being minutely spotted with a deeper brown; the hinder portion of the upper half of the P. fin is black, thus resembling this fin in all the British species of sole; "the edges of all the fins darker than the rest," as described by Mr. Yarrell; the under side of the three larger is pure white, of the three smaller white also, but closely dotted over with extremely minute black spots, which, without close examination, give to this portion the appearance of soiled white; pupil purplish black; irides silvery, in some of them tinged with gold.

On dissection, five of these individuals exhibited milt, and one of them roe; the ova of a very small size, and the milt not much developed. Excepting the stomach of one, which was empty, they all contained a few fragments of *Solen pellucidus* or *minutus*; in addition to this shell, three of them exhibited the remains of *Ophiuræ*; one, besides the *Solen* and *Ophiuræ*, presented some crustacea; and another, in addition to the *Solen*, the remains of marine worms, apparently *Planariæ*.

On May 5, 1837, I obtained a seventh specimen of *P. Pola*, which, like the others, was taken by trawling, at Ardglass. It was $12\frac{1}{2}$ inches long, and exhibited milt moderately developed. Its stomach contained fragments of *Solen pellucidus*, and a specimen of *Bulla lignaria*.

Solea Lingula, Rond.*, Red-backed Sole.—On the 23rd

* Solea *parva sive* Lingula, Rondeletius; see his figure of "la petite sole," p. 260; also Willughby's figure and description, p. 102, F. 8, fig. 1.

of August, 1836, three small specimens of this fish were captured by Mr. Hyndman and myself when dredging on a sandy bottom off Dundrum, in the county of Down.

No. 1.	Length 3½ inches;	D. 68;	A. 56.	
2.	„ 2½ „	72	56.	
3.	„ 2½ „	66	54.	

No. 1.	P. 4 upper side,	2 under side;	V. 5;	C. 18 altogether.		
2.	4 „	2 „	5	18	„	
3.	4 „	2 „	5	19	„	

Breadth of body of No. 1, 13 lines. In form they differ considerably from *Solea vulgaris*, by tapering towards the tail. Dorsal and anal fins similarly connected with the caudal, the last ray of each exhibiting a low inconspicuous membrane, which extends to the base of the outer caudal ray—these three fins, merely touching in this manner, appear at a cursory view unconnected. In the number of rays in the fins, and characters generally, they correspond with Donovan's description of the *Pleuronectes variegatus* (vol. v. p. 117), but differ remarkably from his figure in colouring; nor in this respect do they agree entirely with Hanmer's figure (Penn. Brit. Zool., vol. iii. pl. 48. ed. 1812), with which I consider them identical, as they want the blotches of black represented on the dorsal and anal fins. They also differ a little from each other in colouring, the largest being of an uniform reddish brown on the upper side; the two smaller, of a paler shade, with a series of roundish black spots on the body, a short way inwardly from the back of the dorsal and anal fins, and a few similar spots on the lateral line: in one the spots approaching the fins just named are eight in number, in the other they are fewer and less conspicuous. In the three specimens all the fins except the ventral have, at irregular intervals, an occasional ray black; the rays only exhibiting this colour.

Mr. Jenyns has called attention to the difference of colour and number of rays in the fins of the specimen he examined (p. 468) compared with the individual described by Mr. Hanmer. In both respects it appears the species is subject to considerable variation. Dr. Parnell has more recently described (Mag. Zool. and Bot., vol. i. p. 527) what he considers to be a new species of sole, and names *Monochirus minutus*;

but a comparison of my specimens with his description satisfies me of their identity. The specific character of *M. minutus* is "every sixth or seventh ray of the dorsal and anal fins black," which marking appears in the individuals under consideration, though less regularly; their dorsal fins are connected with the caudal as in this fish, although the junction, as before mentioned, is only observable on close examination. Two of my three specimens at the same time display "blackish spots, which extend beyond the base of the rays [of the D. and A. fins] towards the body of the fish," a character remarked by Dr. Parnell as distinguishing *M. Lingula* from his new species. My specimens generally possess in common the characters of *M. Lingula* and *M. minutus*.

In Mr. Yarrell's collection there is a dried specimen, $4\frac{1}{4}$ inches long, from the Mediterranean, identical with mine, and like them displaying conspicuously, at irregular intervals, the black markings on the dorsal and anal fins*.

Addendum.

Solea Lingula and *Solea variegata*. Belfast, June 18, 1838. Among some small fishes taken by dredging within the entrance to Belfast bay by my friend Dr. J. L. Drummond, on the 16th instant, and considerately forwarded to me when quite recent, were five specimens of *Solea*, or *Monochirus* (Cuv.). Of these, which with one exception were examined before being transferred to spirits, four individuals, varying from $3\frac{1}{2}$ to $4\frac{1}{4}$ inches in length, are the *Solea Lingula*, Rond.; and one, $2\frac{3}{4}$ inches long, the *Pleuronectes variegatus* of Donovan. In our two latest and best works upon the subject—Yarrell's 'British Fishes,' and Jenyns's 'Manual of British Vertebrate Animals'—these names are brought together as synonymous, or representing but one species, with, however, an expression of doubt as to its correctness by the latter author. A comparative examination of the present examples satisfies me that they apply to two distinct species.

In placing the individuals together, the most obvious differ-

* Dublin, June 1838.—A specimen of this sole $3\frac{1}{2}$ inches long, and taken at Youghal, is in the collection of R. Ball, Esq. Its upper side does not exhibit any variegation of colours, but is of an uniform reddish brown hue. The rays of the dorsal and anal fins are occasionally black, as in all individuals of this species I have seen.

ences appear in the dark blotches and transverse bands of *S. variegata* (*Pleur. variegatus*, Don.) contrasted with the comparatively uniform tint of *S. Lingula*; in the scales of *S. variegata* being very much smaller *, in its eyes being relatively to each other placed more vertically, in the dorsal and anal fins being rather more distant from the caudal fin, and in the general form of the body, which tapers less towards the tail; the rays too of the dorsal and anal fins are considerably fewer in number than in *S. Lingula.*

The colour generally of the *S. variegata* is very similar to that of Donovan's figure (British Fishes, vol. v. pl. 117), being of a pale yellowish brown, with the three conspicuous dark transverse markings approximating more the form of bands, and equidistant from each other, the last extending entirely across the body; the indication of a fourth band appears above the termination of the opercle, one (narrow and inconspicuous) at the base, and another near the extremity of the caudal fin; the body is likewise marbled with blackish brown, towards, and spreading over, the base of the dorsal and anal fins; between the bands are faint markings of pale brown; dorsal and anal fins pale yellowish brown, marked irregularly with black towards the tail.

The four specimens of *S. Lingula*, though not all exactly of the same shade of colour, are on the upper side of a pale brown, entirely and closely freckled over with a darker tint, and exhibiting several small roundish dark brown and white spots on the body at the base of the dorsal and anal fins, and along the lateral line: these brown and white spots are often disposed alternately. The largest individual presents in addition to them, small white specks over the body generally.

* Although I here speak only relatively to the size of the scales of *S. Lingula*, the remark may without explanation seem inconsistent with Donovan's "specific character" of the variegated sole, in which the scales are stated to be "large;" but a reference to his general description will show that it is the comparative magnitude of its scales to those of the common sole (*S. vulgaris*) to which he alludes, and in which he is correct, as he likewise is in describing those of the latter species to be "remarkably diminutive." The scales of my specimen accord in size with those of Donovan's figure of *P. variegatus*: being reckoned from the origin of the lateral line to the base of the rays of the caudal fin (those on the rays not being enumerated) they are about eighty-five in number; in the specimen of *S. Lingula* examined there are about seventy scales within the same space. The scales lie more closely to the body in *S. Lingula* than in *S. variegata.*

Rays of dorsal and anal fins occasionally black. Pupil dark blue, surrounded by a golden ring of about a hair's breadth. The number of fin-rays in my specimen of *S. variegata* are D. 63, A. 49, P. 4*, V. 4, C. 19 in all. In two of the specimens of *S. Lingula,* varying most from each other in size, there are 72 rays in the dorsal and 56 in the anal fin; two others have the dorsal with 76 and the anal with 58 and 59 rays.

Both species have papillæ on the under surface of the head, are rough with ciliated scales on the under as well as the upper side, and have the nostrils tubular, but not to such an extent as Risso, terming the projection a "barbillon," figures that of his *Monochirus Pegusa.*

The variegated sole of Donovan and Yarrell appears to be the same, and with it I consider the individual under consideration identical. With Mr. Jenyns's description of *S. Lingula* my other specimens accord, as they also do with Mr. Hanmer's description and figure of the red-backed sole (Pennant's British Zoology, vol. iii. p. 313, pl. 48, ed. 1812), with the exception of the black markings on the dorsal and anal fins, extending over several rays and their connecting membrane, instead of being confined to a single ray as in all the specimens I have examined.

It is worthy of investigation whether the *Monochirus Pegusa* of Risso (t. 3, p. 258, f. 33, ed. 1826) be different from the *Solea variegata* here treated of. The figure and description of that species, though not in every respect accordant with each other, present many characters in common with it.

The *S. variegata* is here for the first time recorded as occurring on the coast of Ireland.

Anguilla latirostris, Yarr. Broad-nosed Eel.—When at Toome (county Antrim) in Sept. 1834, a kind of eel was described to me as very different from the species (*A. acutirostris*) taken there in such abundance when entering the river Bann in autumn, on their passage from Lough Neagh to the sea. It was called "Culloch or hunter-eel," and was

* This refers to the upper side, in which the second ray is the longest, and terminated by a filament; length of this ray and filament 1½ line: P. fin on under side rudimentary, half a line in length, and rays undistinguishable.

stated to differ much in appearance and voracity from that species. A very intelligent fisherman at another part of the lake, distinguishing it by the name of "Gorb-eel," bore testimony to its voracious propensity*. He believes it to live chiefly on pollans (*Coregonus Pollan*), from the circumstance of having frequently known it to destroy these fishes when in the nets. He considers this species to be stationary in the lake, where it is sought for during summer with night lines, generally baited with very large worms or small perch: about 5 lbs. is the greatest weight he has known it to attain.

In Belfast market I subsequently saw quantities of this eel from the above locality, when they proved to be the *A. latirostris.* On pointing them out to an angling friend, I was assured that he had seen similar eels from Lough Erne on sale in Enniskillen. A correspondent writing from Portumna, in allusion it is presumed to this species, mentions a large-mouthed eel, which preys much on fish, as an inhabitant of the river Shannon.

Mr. Yarrell observes, "In its habits the broad-nosed eel has not been distinguished by any peculiarity that I am aware of from the other common eel" (vol. ii. p. 299), but the following circumstances incline me to believe, in addition to what has been mentioned, that there is a further difference in this respect. On looking over some thousand eels, taken in the nets at Toome on the night of the 24th of Sept., I did not recognise one of the broad-nosed species, nor have I seen it among eels brought from this place to Belfast market, nor again with the *A. latirostris* exposed here for sale, have I detected the common eel; but as it is from an examination in a very few instances that I speak, this may perhaps apply only in general terms. The season at which the two species are brought to this market is different, the time for the *A. latirostris* being summer, and autumn for the *A. acutirostris.* The intelligent fisherman before noticed states, however, that he has taken both species on his night lines at the same time. He knew the broad-nosed from the common eel before it appeared at the surface, by the greater resistance offered, and

* Hence probably the name "Glut Eel," by which it was known to Pennant.

frequently it was brought up twisted round the line in its endeavours to become extricated from the hook.

During the summer months the *A. latirostris* is brought in by the tide as it flows over the banks of Belfast bay, and is taken by eel-spearers. A specimen $4\frac{1}{2}$ inches long that I examined, and which was procured off the coast of the county Antrim at mid-winter, had in proportion to its size every character as strongly marked as the largest of its species: the fleshy prominence on each side of the head and terminating at the nape was very conspicuous.

Ammodytes Tobianus, Bloch. Wide-mouthed Sand-eel. —This species is rare on the shores of Ireland as elsewhere compared with *A. Lancea.* Of the latter, were specimens of *Ammodytes* favoured me by Mr. R. Ball from the coast of Cork, and with one exception, all that I have taken from the stomachs of the cod and other fishes. Such likewise, judging from their size, ("four to nine inches in length") are those described in the 'Wild Sports of the West' as sought for on the coast of Mayo, and also those taken on the sands adjoining the village of Bushfoot near the Giants' Causeway. In this last locality I speak on the authority of a gentleman who has often been present at the sand-eel fishing, and who, on being shown my specimens of *A. Tobianus,* remarked that he had never seen any of those taken there at all approaching them in size. In a paper by Dr. J. D. Marshall on the Statistics and Natural History of the island of Rathlin, published in a late part of the Transactions of the Royal Irish Academy, the *A. Tobianus* is enumerated among the fishes of the island; but I have the authority of the author for stating, that it is the common species now distinguished by the name of *A. Lancea**, to which he there alluded.

August 23, 1836.—On inquiring at Dundrum on the coast of Down about sand-eels, I ascertained that two species are procured in the extensive sands here; the larger of which is called "Snedden," and the smaller "Sand-eel," and that they are throughout the district considered as distinct as any two species of fish. This information induced me to attend the sand-eel fishing today, when at the extreme of low water I had

* Both species were until the last few years considered as one, which was designated *A. Tobianus.*

the satisfaction of seeing both *A. Tobianus* and *A. Lancea* taken indiscriminately. From the loose sand covered with water to about the depth of nine inches, the persons engaged in this occupation with great dexterity drew these fishes from their lurking-places, using for the purpose old reaping hooks. These are run through the sands with the right hand drawn towards the left, by which the fish is seized and transferred to a basket strapped round the waist and carried in front. It is in shape like the angler's, but much larger and open at the top. The *A. Tobianus* is said to be always scarce here compared with the *A. Lancea*, and is sometimes not to be found at all. An intelligent fisherman informed me that the greatest quantity he ever took of the former species during "one ebb" was twelve or thirteen quarts. It is by measure both kinds are estimated and sold, the *A. Lancea* producing from one to two pence the quart, and the "sneddens", being more highly prized on account of their superior size, one half more. On inquiring how the two species are distinguished when of equal size, one man stated by the difference of form, and chiefly in that of the head; and another said he knew them by colour alone. Although the difference was in each respect very apparent to myself, I put both parties to the test, and found that the one guided by form, and the other by colour, drew the *A. Tobianus* from his basket with equal dexterity, and without a moment's hesitation singled it out from hosts of the *A. Lancea*. This fishing is carried on here daily throughout the year except in winter, when being full of spawn the sand-eels are considered unfit to be eaten. At other times they are used by all classes of people. In the excellent hotel at Dundrum they were served up to us at dinner along with salmon, and were fried with crumbs of bread strewed over them—for breakfast they are similarly cooked. The poorer people dry them in the sun, and in bright days the tables and trays of the cottage are sure to be seen set out before the doors covered with sand-eels.

August 27.—At Newcastle, about three miles south of Dundrum, great quantities of sand-eels were taken at the morning-ebb of the spring-tide; by some individuals so many as forty quarts. In the evening I reckoned about eighty persons out fishing, and having two one-horse carts in readiness beside

them to carry away the produce; but the harvest that was then gathered fell short of requiring such extra aid*.

Having observed a number of pigs at Newcastle daily frequenting the sand at the extreme edge of the retiring waves, I ascertained, as had been anticipated, that they were in search of sand-eels. This however was not the chosen feeding-ground of these animals, as I subsequently saw them regularly driven out there to forage for themselves. The *A. Tobianus* though taken here is less frequent than at Dundrum.

When at Ballywalter, on the coast of Down, and northwards of the last-mentioned place, in May 1836, I found a few of *A. Tobianus* by examining the sand-eels which fishermen were using as bait, and in the month of March following, obtained a specimen along with two of the *A. Lancea* from the stomach of a sea trout (*S. Trutta*) taken at Donaghadee. On questioning some fishermen at Portaferry, situated just within the entrance to Strangford Lough, in the same county, respecting the two species of sand-eel, I learned that they had not been as such distinguished by them. It was however stated, that they occasionally obtained much larger individuals than ordinary, which from colour were named "green-backs," the common being called sand-eels: the former both from superior size and different colour must doubtless be the *A. Tobianus*.

Amongst a few fishes found dead on the beach at Cairnlough near Glenarm (county of Antrim) in June 1836, by Dr. J. L. Drummond, was a specimen of the *A. Tobianus*. In this as well as every other instance in which I have seen the last-named species, specimens of *A. Lancea* occurred at the same time.

In the 'Wild Sports of the West' there is a short but graphic account of sand-eel fishing by moonlight on the coast of Mayo; and at Strangford Lough and other places in the north of Ireland it is likewise a favourite pastime of the young in the moonlight nights of summer. It is said that from the silvery brilliance of the fish being more striking by night than

* "The coast [at Newcastle] affords plenty and variety of sea fish; and such quantities of sand-eels have sometimes been taken on it, particularly in the late season of scarcity, that the poor carried them away in sacksfull."—Harris's Down, (p. 81.) published in 1744.

day, it is at this time captured with greater facility; but is it not rather for the novelty of *dry-land* fishing, with the additional feature of being achieved by moonlight, that the sport is at this time practised*? Although the sand-eel is noticed in several of the Statistical Surveys of the Irish counties, there is not that I recollect any remark which would lead us to suppose that more than one kind has been observed; but there can be little doubt that both species are found elsewhere than on the coasts of Down and Antrim.

The largest specimen of *A. Tobianus* obtained at Dundrum was 13 inches long. D. 56 (first very short), P. 13, A. 29, C. 15. In all the characters of *form* and relative proportion of parts it agrees with the descriptions of Yarrell and Jenyns. In *colour* this species is of a dark bluish green, while the *A. Lancea* is of a sandy hue like the Atherine (*A. Presbyter*), but tinged partially on the back and sides with bluish green. From the mouth of the specimen described I took a small individual of of its own species†: Bloch and Couch mention similar instances.

The largest *A. Lancea* procured at Dundrum was 8 inches long. D. 54, P. 11, A. 27, C. 14.

Dorsal fin commencing "in a line with the last quarter," and not above "the middle" of the pectoral fins.

Syngnathus Typhle, Linn. Deep-nosed Pipe-fish.—An individual of this species, above 8 inches in length, and obtained in 1835 at Glendore, county of Cork, by Mr. Allman, has been forwarded for my inspection by Mr. R. Ball. Among some small fishes taken along with crustacea, &c. in Larne Lough (county of Antrim) during the summer of 1836, by Mrs. Patterson of Belfast, and very kindly sent to me, was a specimen of *S. Typhle.* Though only 1 inch 2 lines in length, every character in proportion to its size was as strongly marked as in the adult fish.

Syngnathus æquoreus, Linn. Æquoreal Pipe-fish.—A specimen of this fish taken at Youghal (county Cork) has

* Mr. Lukis states that in Guernsey they are sought for by moonlight.—Yarr. Brit. Fish. vol. ii. p. 324.

† An observant friend once saw a sand-eel about four inches in length, taken with bait, which was either a piece of herring or a composition of feathers—the latter a common bait for the coal-fish (*Merlangus Carbonarius*) in the north of Ireland.

been submitted to my examination by Mr. R. Ball. Its length is 19 inches, rays of dorsal fin 40. It corresponds in all respects with this species as admirably characterized by Mr. Jenyns (p. 486); as also does another individual obtained in the autumn of 1836 on the beach near Larne (county Antrim), by Mr. James Marks of that town, who presented it to the Belfast Museum. This specimen is 21½ inches long, but being imperfect at the caudal extremity, must when entire have been at least one inch more. Its D. rays 41. March 15, 1838. I received from George Matthews, Esq. of Spring-vale (county Down), a perfect and beautiful specimen of this fish which was found on the beach there after a high tide during the boisterous weather about the beginning of this month. Its length is 22¼ inches. D. rays 46. Caudal fin apparent to the naked eye; its rays distinguished by a lens, 8 in number. This *Syngnathus* was in the present instance preserved and forwarded to me on account of the fishermen being unacquainted with it.

Syngnathus Ophidion, Bloch. Snake Pipe-fish.—From Mr. R. Ball I have received two specimens of *S. Ophidion*, which were procured in 1835 at Glendore (by Mr. Allman) and Youghal. The larger one is upwards of a foot in length, and with the unimportant difference of *its* having 41 rays on the dorsal fin, both individuals agree in every character with the descriptions of this species by Jenyns and Yarrell, which are much more minute than Bloch's account of it. Mr. Ball has subsequently informed me of his having received a third specimen, about 14 inches in length, from Youghal, where it was captured in July 1836. Soon after this time I received a *S. Ophidion* from the coast of the county of Antrim.

Hippocampus brevirostris, Cuv.? Sea-horse.—Vide Zool. Proc., 1837, p. 58, for the first specimen recorded as Irish. In addition to the individual there mentioned, a *Hippocampus* was taken alive in Belfast Bay in July 1837, by my relative Richard Langtry, Esq., and though ordered to be preserved for me, was unfortunately lost. In consequence of this, its species, as in the former instance, cannot be given with certainty*.

* I am credibly informed that a *Hippocampus* was found dead on the beach near Youghal, on the southern coast, a few years ago.

Petromyzon Planeri, Cuv. Fringed-lipped Lamprey.—I am indebted to Mr. R. Ball for two specimens of this fish, which were obtained in the vicinity of Naas, county of Kildare. They are 4½ and 5 inches in length respectively; the smaller one only has the "anal sheath," which is two lines long. (See fig. in Yarr. B. F. vol. ii. p. 457.) The dentition in these specimens is similar to that shown in Mr. Yarrell's figure of *P. fluviatilis*, and consequently in this character they do not accord with his figure of the mouth of *P. Planeri*; in this same wood-cut however, the chief peculiarity of the species—the fringed lip—is well represented. The dentition or "armature of the mouth" of *P. fluviatilis* and *P. Planeri* is similar, as remarked by Mr. Jenyns*.

April 2, 1838. From the Rev. Charles Mayne, Vicar General of Cashel—to whose kindness I have in several instances been indebted for specimens of fishes, &c., from the river Shannon—I to-day received a lamprey, 4¾ inches in length, recently taken in the vicinity of Killaloe, and which proved to be the *P. Planeri.*

Addendum to vol. i. p. 356.

Gobius gracilis. Dublin, June 1838.—In the collection of my friend Robert Ball, Esq. of this city, there are two specimens of *Gobius gracilis* about 3 inches in length, from Youghal. On closely comparing them with individuals of *Gobius minutus* of equal size, the differences in so far as they are above mentioned are very obvious; but further, as in those before examined, I cannot perceive any constant characters.

III.—*Botanical Notes of a Tour in Ireland, with Notices of some new British Plants.* By J. Ball, Esq., of Christ College, Cambridge.

The attention of British naturalists having been recently directed towards the wide field for investigation which Ireland presents to them, it may perhaps not be inappropriate to offer some additional information for the botanical tourist, gathered

* Dublin, June 1838.—Specimens of this Lamprey have lately been received by R. Ball, Esq. from Inch river, about ten miles north-west of Youghal.

during an excursion from Dublin through the northern part of the island in the summer of 1837; as also to notice the discovery of two or three plants, which are, I believe, new to the British Flora. The neighbourhood of Dublin is principally rich in some of the more local sea plants; I may mention as a station for several of these the south-eastern side of the rocky point of Killiney Hill, which runs out towards the small island of Dalkey. I have here gathered *Inula* (Limbarda, *Hook.*,) *crithmoides, Lavatera arborea, Euphorbia portlandica, Linum angustifolium, Statice spathulata, Daucus maritimus,* &c. Further south, near Bray, *Marrubium vulgare* may be seen more truly wild than it usually is in Ireland, extending for some distance along the shore, as also upon the common near the town: on banks near the road, between Bray and Enniskerry, *Erodium moschatum* appears certainly indigenous, and near the latter village I have noticed *Melissa Calamintha* (Calamintha officinalis, *Hook.*), and *Polygonum minus, Scirpus Savii, Habenaria chlorantha,* &c., as also *Geranium pyrenaicum* certainly wild and very common. *Eriophorum pubescens,* which has hitherto been found in the boggy ground just above the village, is, I fear, extirpated by drainage. In the sand pits on the hill by the Dublin road may be noticed *Festuca bromoides,* and also a remarkable state of *Hieracium Pilosella,* apparently intermediate between that plant and *H. Peleterainum,* Merat., which latter is however by many botanists considered a mere variety of *H. Pilosella.*

In Glen Cree, a valley running from Powerscourt to Lough Bray, I have gathered *Carex lævigata, Senecio viscosus, Pinguicula lusitanica, Myosotis repens, Pyrus Aria,* &c.; and on the mountains south of Glen Cree I have found a *Leontodon* (Apargia, *Hook.*), to all appearance distinct from any recognised British species. If it be possible to judge by mere descriptions in this difficult genus, I should consider it to be *L. alpinum,* Jacquin, (L. pyrenaicum, *Gouan,*) though in some respects it approaches more near to *L. hastile* of Linnæus.

The neighbourhood of Powerscourt Waterfall is remarkably productive in ferns; in addition to the common species, there are found here *Polypodium phegopteris, Nephrodium oreopteris, Hymenophyllum Tunbridgiense* and *H. Wilsoni* (which latter

is not rare on the Irish mountains), and here for thirty years has been known to grow a single frond of the rare *Trichomanes brevisetum.* On the south side of the stream, below the waterfall, and elsewhere in the same neighbourhood, grows a species of *Nephrodium* which Mr. Mackay considers identical with *N. dumetorum* of Smith. The plant however by no means agrees with the specimen in Smith's Herbarium, which is nothing but a small diseased specimen of *N. dilatatum.* The present specimen differs widely from any of the forms of that variable plant which I have seen; how far these differences may be permanent is of course a question to be determined by more experienced botanists than myself. Near the same place I have observed a concave variety of a *Nephrodium* of the *spinulosum* tribe*, which may possibly be the same as the variety of *N. dilatatum* mentioned by the Rev. W. Bree in Mag. Nat. Hist. vol. iv., though it differs very constantly both in form and habit from that plant. I have found it also on the Great Sugar Loaf in the County of Wicklow and on Curslieve Mountain in Mayo.

Salix herbacea may be gathered on rocks at the summit of Djouce mountain, and is, I believe, found in similar situations on other mountains of this group. Upon the great Sugar Loaf, which, like other mountains composed of quartz rock, is exceedingly unproductive both in animal and vegetable life, almost the only plant of interest is the *Melampyrum montanum,* Johnstone. This plant, which I have met in a similar situation on Curslieve in Mayo, is found by the side of the largest gully on the east side of the mountain; it preserves very constantly its distinct habit. I am not aware whether it has ever been remarked that the form of the lowest pair of leaves is always obovato-lanceolate, being quite different from that of the superior ones. In boggy ground, at the north-east base of the mountain, grows the *Wahlenbergia* (Campanula, *L.*) *hederacea,* mentioned by Mr. Mackay as growing upon this mountain. In the Dargle, near the bed of the river, may be found *Meconopsis cambrica,* and *Bromus giganteus* β, and

* The name *spinulosum* appears more applicable to this than to any plant of this genus, the serratures of the pinnules being all tipped with stiff hairs, which converge towards the extremity of each pinnule.

Bryum punctatum abundant in fructification. Returning to Dublin, and proceeding northward along the shore of the bay, *Linum angustifolium* may be found plentifully on banks between Clontarf and Howth; on the sandy sea shore *Euphorbia paralia* is abundant. Close to the ruined church of Kilbarrick may be seen the five British species of *Papaver, P. somniferum* being as truly wild as it is ever seen in Britain. In addition to many rare or local plants mentioned by Mr. Mackay I have found in the sandy fields near this spot, *Bromus erectus, Festuca rubra,* and *Avena pubescens,* and in a marsh near Baldoyle, *Heliosciadium inundatum.* On banks above the village of Howth I have collected a species of *Sagina,* differing in appearance from the described British species, and agreeing very closely with a specimen from Sussex, named by Mr. Borrer the *Sagina filiformis* of Pourret. For many rare plants in the neighbourhood of Portmarnock, stations are given in Mackay's Flora Hibernica: I may observe that the species of *Viola,* named in that work *V. Curtisii,* and which agrees with cultivated specimens from a plant so named by Mr. Borrer, is not the *V. Curtisii* of the original description, which agrees with *V. lutea* in having the centre lobe of the stipules undivided, being probably no more than a variety of that plant; whilst the plant in question, which is abundant on the sandy coasts north of Dublin, and which I have seen also in the counties of Down and Derry, is apparently very nearly allied to the *V. saxatilis* of continental writers, which in common with all the many named forms of *V. tricolor,* has the middle lobe of the stipule dentate. On the sandy warren near Portmarnock I noticed a tetrandrous species of *Cerastium,* which appears to be identical with the *C. pedunculatum,* described and figured by Mr. Babington in vol. ii. p. 197. Pl. VI. of the Magazine of Zoology and Botany. I may mention having noticed in the county of Dublin the *Fumaria parviflora,* for which only a single station is given in the 'Flora Hibernica.' At Clogher Head, in the county Louth, I found in a corn field, just above the village, *Thlaspi arvense* and *Lamium incisum,* both rare in Ireland; and on the summit, *Trifolium striatum* and *Trigonella ornithopodioides*; and on steep banks over the sea *Statice spathulata* and a white variety of *Anthyllis vulne-*

raria, first found, I believe in Kerry, by Miss Hutchins. Near this I likewise found *Fedia auricula,* and, which is quite as rare in Ireland, *Lepidium campestre,* the place of which plant, so familiar to the English botanist, is almost always filled in this island by *L. Smithii.* I may mention that the distinctive character drawn from the smoothness of the capsule in *L. Smithii,* though very general, cannot be relied upon, the only constant character being, as I believe, the comparative length of the styles. At Jonesboro', near Dundalk, I observed a white-flowered variety of *Galeopsis Tetrahit,* the same I believe with the var. *β pubescens* of Henslow's Catalogue of British Plants; it has the leaves of a more acutely lanceolate form, and the whole plant has a softer and more abundant pubescence.

I may here mention that near Newcastle in the county Down, the rare *Achillea tomentosa* has been found by Miss Keown. Sir J. E. Smith mentions his having received this plant from Ireland, but no station has before been made known for it in that country. The neighbourhood of Belfast is peculiarly rich in botanical productions, to the stations for many of which I was directed by my friend Professor Bryce. I may mention some additional objects of interest which have not, I believe, been previously noticed. On the south side of the bay, between Belfast and Hollywood, I found *Atriplex littoralis, Blysmus rufus,* and *Scirpus glaucus.* By the side of a sandy lane, to the right of the road to Hollywood, I remarked a singular straggling variety of *Viola lutea,* which plant is very rare in Ireland. Here also may be found the *Rosa Hibernica,* which has become very scarce in this neighbourhood. Upon that interesting botanical station the Cave Hill, I found a late single-flowered variety of *Saxifraga hypnoides,* the flowers of which were mostly sessile upon the extremities of the procumbent shoots; some, which had elongated flower stalks, appeared identical with the form described by Smith under the name of *elongella*: together with this, upon the south side of the hill, I found the *Alchemilla vulgaris β minor* (A. hybrida, *Pers.*); it appears to differ in nothing from *a* but in its small size and dense white spreading pubescence, which gives it a hoary appearance. The finest specimens of the rare *Orobanche rubra* (some of them nearly a foot in height) are to be found

on the basaltic rocks at the south-east angle of the hill. Under bushes at the east side I found *Circæa intermedia* very luxuriant both in flower and fruit, as likewise *Vicia sylvatica*, &c. At Colin Glen, a few miles from Belfast, I gathered specimens of *Rubus saxatilis*; and in boggy ground, about half way up the Glen, a single specimen of a fern which corresponds accurately with Smith's original specimens of *Nephrodium cristatum* (N. callipteris, *DC.*). Nearly in the same place I collected *Mentha rubra* and a *Galium*, apparently of the *palustre* tribe, but without flower or fruit, remarkable for the leaves in the whorl being constantly four in number. In ascending from the lower woody part of the glen to the rocks at the summit, the botanist can scarcely fail to remark the gradual transition from a very divided form of *Aspidium angulare* through the forms named *aculeatum* and *lobatum*, to one on the rocks above, which cannot be distinguished from *A. lonchitis**. Throughout a great part of Antrim I noticed *Rubus Idæus* as the most common species of the genus in hedges and woods as also on rocky ground.

At Coleraine in Derry, *Carum verticillatum* is found in great abundance by the west bank of the river about a quarter of a mile below the town. In a potato field near the same place I found *Lamium intermedium*, which is new to the Irish Flora; I also found it in a similar situation near the foot of Ben Bulben in Sligo, and it is probably not rare in the northern counties. On sandy ground, near the mouth of the Baun, I noticed *Gnaphalium minimum* and *rectum*, and *Trifolium medium*. I may direct the attention of the conchologist to the sandy coast of Magilligan, which is very productive in marine shells. In addition to many rare plants mentioned in the Flora Hibernica as growing on Ben-ye-venagh, I found many alpine species not common in Ireland, *Silene acaulis*, *Dryas octopetala*, *Saxifraga hypnoides*, *Salix herbacea*; and on Umbragh rocks *Rubus saxatilis*. Throughout the counties of Derry, Tyrone, Donegal, and Sligo *Galiopsis versicolor* is common; but I may observe as somewhat remarkable, that I have never

* In this glen some rare land shells, *Helix fusca* and *scarburgensis* (lamellata, *Drap.*), are to be found: for the direction to this spot I am indebted to that active naturalist Mr. Thompson of Belfast.

seen it except in potato fields; a fact somewhat corroborative of the opinion as to its being a luxuriant variety of *G. Tetrahit.* In the neighbourhood of Enniskillen, on the banks of Lake Erne, I found *Circæa intermedia* and *Galium boreale*; and in the same locality many species of *Mentha* might probably be discriminated by a botanist acquainted with that difficult genus. Perhaps the mountains of Sligo offer the most promising field to the inquiring naturalist of any part of Ireland. I may mention the results of a hurried visit to Ben Bulben, which is already known to be a habitat of *Arenaria ciliata* and many other rare plants; on the limestone ledges at the north-west angle of the mountain I found *Dryas octopetala, Silene acaulis, Saxifraga hypnoides* and *Aizoides, Juniperus nana,* and a very diminutive variety of *Thalictrum minus,* which has possibly been mistaken for *T. alpinum,* said to grow on this mountain. A little to the east, on the northern face of the rock, I gathered a very large glabrous-fruited form of *Carex recurva,* probably the *C. Micheliana* of Eng. Bot., and in the same spot *Polygonum viviparum,* not mentioned in the Flora Hibernica; but in a notice in the Mag. Nat. Hist. since pointed out to me, I find that it was gathered nearly in the same spot many years ago by Mr. Murphy. Proceeding eastward along the ledges of limestone, which abound in fossils, particularly many species of corals, I found growing in company with *Sesleria cœrulea* a grass new to the British Flora, the *Kœleria valesiaca,* Gaud. Near the same place I noticed *Asplenium viride, Cystopteris fragilis,* &c. On the bogs between Sligo and Ballina I gathered *Gnaphalium rectum, Osmunda regalis,* and *Juncus nigritellus,* Eng. Bot. Supp., a plant apparently quite distinct from *J. lamprocarpus*; and near the coast *Raphanus maritimus* and *Scirpus Savii, β. monostachys,* a form which I have also noticed in Wicklow. Near Ballina *Gentiana Amarella* occurs with white flowers. In the great boggy district of Tyrawley, the herbage consists principally of *Rhyncospora alba, Schœnus nigricans, Eleocharis palustris, Drocera anglica,* and *Osmunda regalis,* with a few of the more common carices and junci. After passing the night at a cottage about seven miles from its base, I next day ascended Curslieve, one of the highest mountains in the Erris group. By the side of a stream, descend-

ing from Currough-na-Gorragh, a small lake at a considerable elevation on the mountain, I gathered *Melampyrum montanum*, and a concave *Nephrodium* which I have already mentioned. I also found here a species of *Epilobium* with downy fruit somewhat allied to *E. alpinum*; it corresponds accurately with the description of *E. nutans* in Reichenbach's 'Flora Excursoria Germanica,' and Professor Don considers it identical with that plant. On the rocks above Currough-na-Gorragh I observed a variety of *Saxifraga stellaris* with a large spreading panicle, the leaves covered with long dense hairs larger and more deeply cut than in the ordinary state of the plant. *Saxifraga umbrosa* β. (S. punctata, *Haworth*), is abundant on this and all the other mountains in this part of Ireland. Between Newport and Castlebar I noticed *Nepeta Cataria*, probably not indigenous, growing to the height of three or four feet. The limestone district on the banks of Lake Carra near Castlebar, is exceedingly productive in rare plants; on the north-eastern shore near Moore Hall I found *Gentiana verna* in fruit, a dwarf red-flowered variety of *Gentiana Amarella*, *Gnaphalium dioicum*, *Thalictrum minus*, sometimes growing to a large size and approaching very near to *T. majus*, *Galium boreale* in great luxuriance, &c. To the west of this point I found *Neottia spiralis* and *Equisetum variegatum*. On a point of low rocky land called Derrynany, I found *Rhamnus catharticus* and *frangula*, both very rare in Ireland; *Rubia peregrina*, *Euonymus europæus*, and a fern in abundant fructification but with the capsules all burst, probably a *Nephrodium*, in which case it is allied to *N. thelypteris*, but differs in its very rigid habit, and in having the pinnules finely serrated and wanting the characteristic depression of the two lower pinnæ.

Near Delphi in Morrisk I noticed *Lycopodium selaginoides* with *Saxifraga umbrosa*, and *Daboëcia* (Menziesia, *Sm.*) *polifolia* in great abundance, as also *Anthemis nobilis*, which is a rare plant in Ireland. In a walk across the district lying between the Mamturk mountains and the group called the Twelve Pins, I gathered several of the peculiar plants of this district, as *Eriocaulon septangulare*, *Utricularia minor* and *intermedia*, &c.: also on rocks in the bed of the river above Lough Inagh, *Galium boreale*, *Thalictrum minus*, and *Hiera-*

cium umbellatum, in a very reduced state and generally with only a single flower to each stem. An account of the botany of Connamara having been published by my friend Mr. Babington in vol. ii. of the Mag. Nat. Hist., it will be unnecessary to add anything further as to this district. On the limestone rocks at Kilcornan near Galway, I collected *Grammitis ceterach, Melissa Calamintha, Asperula cynanchica, Euonymus europæus, Saxifraga tridactylites,* &c.; also, which may appear somewhat remarkable, on level ground near the sea, *Juniperus nana* in great abundance and luxuriance.

I cannot close this brief notice without expressing my obligations to my friend Mr. Babington for his assistance in the determination of many of the plants here mentioned.

It is hoped that these results of a very hurried visit to some little frequented parts of Ireland, may tempt some British naturalists to bestow a more careful examination on the hitherto little investigated districts of the west, where there can be no doubt that much would be found to repay their exertions.

IV.—*Some Account of the Genus* Langsdorffia. *By* G. W. Arnott, Esq., LL.D.

Langsdorffia Mart.

Receptacula solitaria, stipites simplices terminantia, unisexualia. *Flores* masculi inter paleas clavatas basi complanata in favi modum nexas sessiles. *Perigonium* infundibuliforme, limbo 3—5-fido, laciniis æstivatione induplicato-valvatis. *Stamina* 3—5, monadelpha, perigonii laciniis opposita; columna solida, tubo perigonii adnata, parte libera anthesis breviore: antheræ connatæ, extrorsæ, biloculares; loculi æquales, juxta totam longitudinem dehiscentes. *Ovarii* rudimentum nullum. *Flores* feminei (imperfecti?), confertissimi, pedicellati. *Stylus* filiformis simplex. *Ovarium* stipitatum in stylum gracilem attenuatum. Herbæ *carnosæ*, stipites *e rhizomate hypogæo crassiusculo assurgentes, simplices, squamis obsessi, monocephali.* Capitula *unisexualia, alia ex eodem rhizomate mascula, alia feminea.*

1. L. *janeirensis*; rhizomate repente subsimplici, stipitis squamis arcte imbricatis lanceolatis villoso-fimbriatis, perigonio masc. trifido laciniis demum patentibus, floribus fem. (glandulam nullam ambientibus?) infra stylum bulboso-granulosis.—L. janeirensis, *L. C. Richard, in Mem. du Mus. d'Hist. Nat.* viii. *p.* 412. *t.* 19.—L. hypogæa, *Mart. Journ. von Brasil,* ii. *p.* 179; *Nov. gen. et sp.* iii. p. 181. *t.* 299.

Hab. in sylvis umbrosis circa Rio Janeiro.

As no notice is taken of the glands which in the next are

found mixed with the female flowers, I presume that they do not exist, but have not myself been so fortunate as to examine specimens.

2. L. *indica*; rhizomate cæspitoso ramoso, stipitis squamis patulis ellipticis margine glabris, perigonio masc. 4—5-fido laciniis demum reflexis, floribus fem. circa glandulam pyriformem stipitatam insertis lævibus. —L. indica, *Wight et Arn. ined.*; *Hook. Ic. Pl. t.* 205, 206.—Balanophora indica, *Wall. Cat. n.* 7247.—B. elongata, *Blume en pl. Jav.* i. *p.* 87?

Hab: In Peninsula Indiæ orientalis prope Courtallum et Cunnawady, atque in monte Newere-Ellia in insula Ceylano, *Wight.*

Rhizoma carnosum, amorphum, ramosum, ramis brevibus crassis subpræmorsis. Caules seu stipites cæspitosi, erecti, crassi, 4—6-pollices alti, monocephali, e basi usque ad capitulum squamis patulis tecti, alii ejusdem cæspitis masculi-flori, alii femini-flori. Foliorum loco squamæ obovales vel ellipticæ, obtusæ, versus basin angustatæ, summæ consimiles, omnes flavido-virentes, carnosæ, siccatione rigidulo-membranaceæ, glaberrimæ, minime ciliolatæ, persistentes.—Capitulum masculinum sessile, ovato-globosum vel cylindraceo-ovale, obtusissimum, nunc squamis stipitis summis involucratum, nunc omnino emersum. Flores numerosi, majusculi, circa axin dense spiratim dispositi. Axis seu receptaculum crassi stipitis, subcylindraceum, apice quandoque paullo crassius, paleis carnosis clavatis apice truncatis basi membranaceis ac in favi modum connexis obsitum. Perigonium intra singulos alveolos solitarium, sessile, infundibuliforme, paleis subtriplo longius: tubus cylindraceus semipollicem fere longus, androecio omnino farctus, pedicellum cylindricum crassiusculum referens: limbus sæpius quadrifidus, haud raro tamen quinquefidus; laciniæ æquales, duas tresve lineas longæ, ovales, obtusæ, æstivatione induplicato-valvatæ, dein patentissimæ, demum reflexæ. Stamina monodelpha: columna filamentorum solida tubo perigonii cohærens, extra tubum breviter exserta: antheræ 4—5, laciniis perigonii oppositæ, circa columnæ apicem solidum connatæ, singulæ, cordatæ, biloculares, loculis æqualibus intus septulo longitudinali secundario biloculatis, per totam longitudinem extrorsum dehiscentes, septulis post pollinis emissionem albo-membranaceis patulis cristas tenues 16 vel 20 longitudinales simulantibus. Pollen subsphæricum, compressiusculum, angulis tribus poriformibus.—Capitulum femineum sessile, ovoideum, squamis stipitis summis involucratum. Flores innumeri, minutissimi, totam axeos seu receptaculi ovoidei superficiem densissime tegentes, pedicellati, læves, fasciculatim dispositi: fasciculi a plurimis floribus circa glandulam insertis compositi: glandula obpyriformis, fusco-purpurea, semipellucida, obscure cellulosa, stipitata; stipes basi incrassata flores sustinens, supra basin gracilis. Ovarium ovoideum vel subglobosum, sæpe inæquilaterum, atro-fuscum, basi in pedicellum apice in stylum attenuatum, ad styli basin lineola transversali (limbum perigonii cohærentis truncatum verosimiliter indicante) obscurissime notatum, intus ut videtur solidum homogeneum ac inovulatum, ideoque forsan in nostris abor-

tivum. Stylus filiformis, lævis, apice crassior ac truncatus, structura subcellulari, ex apice ovarii attenuato tarde deciduus, ovario colore pallidior: stylorum apices glandulam supra descriptam vix superantes.

Richard, in his account of the genus, considers the female flowers hitherto known to be imperfect: "nescio quid imperfecti in omnibus trium capitulorum a me dissectorum floribus femineis deprehendens, ad suspicandum alia existere capitula perfectioribus onusta floribus moveor." Most other botanists adopt the same view. I have never in the Indian species been able to find so perfect a perianth as Richard found in that from Brazil; and although the reputed ovaria were much more swollen than those which Richard saw, I cannot find the smallest trace of an ovule. I should therefore have thought it probable that those female capitula which arise from the same rhizoma as the male, were always imperfect, and that the fertile ones were to be found on a different plant, perhaps accompanied by imperfect males; but Dr. Wight has observed the *L. indica* in different places and at different times, and he seems never to have detected any other than the form above described. Blume, if indeed his *Balanophora elongata* be the same as that from Dr. Wight, while he inserts it in *Balanophora,* makes no exception as to the imperfection of any of the female flowers: but that plant is referred doubtfully by Endlicher to *Cynopsole,* a new genus, which is said to be diœcious (the *male only* being known), but which may with equal probability be held to be monœcious, and would then only differ from *Langsdorffia indica* by "flores masculi singuli bractea canaliculata excepta," instead of these bractea or paleæ being clavate upwards while their membranaceous bases intersect each other and form cells. Blume also says of his plant that it is diœcious, but from the account given in the generic character of the structure of the monœcious species, it is obvious that by *diœcious* he only alludes to the capitula being unisexual.

Further observations may thus prove the three to be one and the same species. Whether we suppose that Blume saw perfect females, and that he found the structure as in the genus *Balanophora,* where the ovaria are "one-ovuled and attenuated upwards into a setaceous style," or that the style

described by Richard, and above in Dr. Wight's species, belongs to a complete but imperfectly observed female flower, I cannot draw the conclusion at which Endlicher has arrived, that *Langsdorffia* belongs to the same section of the order as *Helosis* and *Scybalium*, both with two styles and a bilocular ovary: it appears to me to be more intimately related to *Balanophora*, and this relation is confirmed by the female flowers of *B. indica* being placed on glandular partial receptacles, as in *Balanophora fungosa* of Forster. From *Balanophora*, however, *Langsdorffia* is readily recognised, by the males and females being on different, not on the same receptacles, and by the ovaria being stalked, so that the ovary, considered along with the stalk and style, may almost be called fusiform. If, Endlicher, as I incline to think, has described his genus *Cynopsole* from imperfect materials, and if Blume's *Balanophora elongata*, and Wight's *Langsdorffia indica* be referable to it, and if the original *Langsdorffia janeirensis* is really destitute of the glands that are intermingled with the female flowers of the other, *Cynopsole* may still be kept up for the eastern species.

I may here remark that the ovary and style represented by Forster agree tolerably well with those observed in Dr. Wight's plant; that Forster, as appears from his manuscripts quoted by Richard, was doubtful if what he saw was an ovarium, or that it was one-celled, and that he had seen neither pericarp nor seed; from which it may be inferred that the female flowers observed were in appearance equally imperfect with those of *Langsdorffia*. It appears, however, from Blume's generic character (en. pl. Jav. i. p. 86) that he had at last ascertained them to be perfect, and that the fruit is crustaceous and one-seeded.

V.—*On a new Species of British Fish* (Motella cimbria). By Richard Parnell, M.D., F.R.S.E.

[With a Plate.]

Motella cimbria*, the Four-bearded Rockling.

Specific characters.—Snout with three barbules, and one on the chin. Plate III.

* *Gadus cimbrius*, Linnæus.

Description.—From a specimen 14 inches in length. Form closely resembling that of the five-bearded rockling, but the length of the head is somewhat greater compared to that of the body; body elongated, rounded in front, compressed behind, tapering from the vent to the caudal extremity, greatest depth less than the length of the head. Head one-sixth of the entire length, caudal fin included, slightly depressed; snout blunt, projecting considerably beyond the under jaw; eye large, of an oval form, placed high up, and about its own length from the point of the snout; operculum rounded, oblique; gill-opening large; gape wide; maxillary extending in a line with the posterior margin of the orbit; *teeth* sharp, and fine, situated in two rows on the under jaw, and in five rows on the upper, a few are also placed in a cluster on the anterior part of the vomer; *barbules* four, one a little in front of each nostril, one at the extremity of the upper lip, and one on the chin; tongue fleshy, smooth, and without teeth. Fins, first dorsal obsolete, scarcely discernible, commencing over the operculum, and terminating a little in front of the second dorsal, composed of a number of short, fine, capillary rays, of which the first is the largest, presenting an appearance, according to Linnæus, of the letter T, but this latter character I was unable to recognise in the present example, owing to that ray having been somewhat destroyed previously to the fish coming into my possession; second dorsal taking its origin in a line over the ends of the pectorals, and terminating a little in advance of the caudal, the anterior portion nearly of equal height, the rays in the posterior half more sensibly increasing in length to the last but four, from thence rapidly diminishing, the first ray simple, the rest branched; anal commencing in a line under the twelfth ray of the second dorsal, and ending under the last ray but three of the same fin, in form similar to the second dorsal, but the rays scarcely more than one half the length, the first ray simple, the rest branched; caudal, rounded at the extremity, the lengths of the middle rays equalling the space between the first and twelfth rays of the anal, the lateral rays simple; ventrals jugular, the second rays the longest, about two-thirds the length of the pectoral; pectorals rounded at the extremities, equalling the length of

the caudal, the first rays stout and simple, the rest branched. The fin-rays in number are

1st D. 50; 2nd D. 50; P. 16; V. 5; A. 43; C. 20; Vert. 52.

Scales small, smooth, and adherent, covering the head, body, and membranes of the dorsal, caudal and anal fins; lateral line distinct, formed by a number of oval depressions placed at intervals from each other, commencing over the operculum, taking a bend under the ninth, tenth, and eleventh rays of the second dorsal fin, from thence running straight to the middle ray of the caudal. Colours, back and sides of a greyish brown, belly dirty white, second dorsal fin edged with white, which is more apparent towards the caudal end; upper half of the caudal fin tipped with white; pectorals, caudal and lower parts of the dorsal, dark brown approaching to black; anal and ventrals dusky.

Two well-known species of *Motella* are frequently met with on our coast, the *Motella quinquecirrata* and the *Motella vulgaris*; but I am not aware of the *Motella cimbria* (*Gadus cimbrius* of Linnæus) having previously been noticed as a British fish. It was found in June last, a little to the east of Inchkeith, on a haddock line baited with muscles, and sent me by the fishermen of Newhaven, as being the only fish of the kind they had ever met with. From its general appearance, they at once recognised it to be closely allied to the five-bearded rockling (*Motella quinquecirrata*), a common species throughout the coast, but on comparison the differences between them were obvious; and although the two fishes do disagree in some particulars, yet it is difficult to point out accurately and satisfactorily, to those who are not in the habit of handling them, what these particulars are. Some authors, placing no dependence as a character on the numbers of barbules on the snout, consider the five-bearded rockling and the three-bearded rockling as mere varieties; but this is not admitted either by Mr. Yarrell or by Mr. Jenyns, who very justly consider them as deserving of a place as distinct species in their valuable works on British Ichthyology. The four-bearded rockling, according to Linnæus, occurs in the Atlantic and Norway seas, and is distinguished by the first ray of the anterior dorsal fin pre-

senting the form of the letter T. On dissecting the specimen I examined, I found the stomach filled with shrimps and small crabs: the cæcal appendages were few in number; the roe was large, the ova small and numerous, and apparently in a fit state to be deposited. It is probable that the habits of this fish are similar to those of the other species, but from its rarity it is difficult to determine.

The *Motella cimbria* differs from *Motella quinquecirrata* in the following respects:—in the snout having but three barbules; the head one-sixth of the whole length; the teeth sharp and slender, placed in two rows on the under jaw; the eye large, of an oval form; the snout much produced; the gape wide; from the point of the snout to the posterior extremity of the maxillary, from thence to the origin of the pectoral, equal; the lateral line very distinct; the tips of the upper half of the caudal rays white; the second ray of the ventral fin but slightly produced; the rays in the anterior half of the second dorsal nearly double the lengths of those of the anal; whereas in *M. quinquecirrata* the snout is furnished with four barbules; the head one-sixth the length as far as the base of the caudal fin; the teeth, blunt and stout, placed in three rows on the under jaw; the eye small, nearly circular; the snout but slightly produced; the gape rather small; from the point of the snout to the posterior extremity of the maxillary, from thence to the origin of the ventral, equal; the lateral line very indistinct; the caudal fin of a uniform brown; the second ray of the ventral fin much produced; the rays in the anterior half of the second dorsal about equal the lengths of those of the anal.

The *Motella cimbria* differs from *Motella vulgaris* in the snout being produced, and furnished with three barbules; the teeth small, fine and slender, all nearly of equal length and size; the anal fin with forty-three rays; the body without spots; whereas in *M. vulgaris* the snout projects but slightly, and is furnished with only two barbules; the teeth irregular, long and stout, with small ones at the base, closely arranged in many rows; the anal fin with fifty rays; the body with a number of large dusky spots. The form and arrangement of the teeth in this species are very striking.

VI.—*Additional Note on the British Shrews.* By the Rev. L. Jenyns, M.A., F.L.S., &c.

Since the publication of my last memoir I have seen a third specimen of the *Chestnut shrew* in the museum of the Zoological Society; and on comparing it with my own, I find it so exactly similar, both in form and colours, with the sole exception of these last being somewhat paler, as to remove all doubt in my mind of its being a distinct species from the *Sorex tetragonurus.* The following may serve as the distinguishing characters of these two shrews:—

1. *S. tetragonurus,* Herm. (*Square-tailed Shrew.*)—Snout broad, compared with that of the *common shrew*: feet, fore especially, much larger: tail slender, more quadrangular at all ages, and slightly attenuated at the tip; clothed with closely-appressed hairs in the young state, in age nearly naked: upper parts very deep reddish brown; under parts dark yellowish grey.

2. *S. castaneus,* Jen. (*Chestnut Shrew.*)—Snout and feet much as in the last species, but the former rather more attenuated: tail moderately stout, nearly round, well clothed with hairs, which form at the extremity a long pencil; upper parts, as well as the snout, feet and tail, bright chestnut; under parts ash-grey.

The specimen of this shrew in the Museum of the Zoological Society is a female, not yet arrived at full size. The length of the head and body is 2 in. 1½ lin. That of the tail, 1 in. 7½ lin.

With regard to the error* of my considering the British water-shrew as distinct from the *S. fodiens* of the continent, I may observe that it has been already in part corrected in my last memoir, wherein I stated that further investigation had led me to believe that it was the real *S. fodiens* of Gmelin, as well as of Bechstein, Brehm, and Wagler. If it be also the *S. fodiens* of Duvernoy, the error of regarding them as distinct has originated, not with me, but with the author just mentioned, who must have assigned a wrong type of dentition to his own species. And such, from the statement of Nathusius quoted by the editor in the last number, would seem to be the case.

Swaffham Bulbeck, July 31, 1838.

* Alluded to by Nathusius in his memoir on the European shrews, according to the Editor of this Magazine, to whom I am indebted for drawing my attention to the circumstance. See the last number of the *Annals,* i. 427.

VII.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from vol. i. p. 462.]

CONVOLVULACEÆ, *Juss.*

1. Calystegia, *R. Br.*

394. *C. sepium. Br. Prodr.* i. *p.* 483. *A. Rich. Fl. Nov. Zel. p.* 250. *Rœm. and Sch. Syst. Veg.* iv. *p.* 182.—Convolvulus sepium. *L. Engl. Bot. t.* 313.—C. Tugurionum. *Forst. Prodr. n.* 74.

New Zealand (Middle Island).—1773, *G. Forster.* (Northern Island), River Thames.—1827, *D'Urville.* Bay of Islands in marshy ground.—1826. *A. Cunningham.* Wytangy and Keri-Keri rivers.—1834, *R. Cunningham.*

395. *C. Soldanella. Rœm. and Sch. Syst. Veg.* iv. *p.* 184. *A. Rich. Fl. Nov. Zel. p.* 200. *Endl. Prodr. Fl. Norf. p.* 52.—Convolvulus Soldanella, *L. Engl. Bot. t.* 314.

Ponè incolarum Tolagæ. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Tolaga Bay, east coast.—1827, *D'Urville.* Shores of the Bay of Islands.—1834, *Rich. Cunningham.*

Obs. L'espèce que M. R. Brown a décrite sous le nom de *Calystegia reniformis*, ne diffère en rien du *C. Soldanella, Rich. loc. cit. conf.* R. Br. Prodr. p. 484.

2. Ipomæa, *Jacq.*

396. *I. pendula. R. Br. Prodr.* i. *p.* 486. *Endl. Prodr. Fl. Norf. p.* 52. *Andr. Rep.* 613.

New Zealand (Northern Island). On the banks of the Hokianga river among fern ; also on the Kana-Kana river, Bay of Islands.—1834, *R. Cunningham.*

3. Dichondra, *Forst. Char. Gen.*

397. *D. repens. Forst. Prodr. n.* 134. *Br. Prodr.* i. *p.* 491. *Willd. Sp. Pl.* 1. *p.* 1353. *Smith Ic. Ined.* i. *p.* 8. *t.* 8. *A. Rich. Fl. Nov. Zel. p.* 201. —Steripha reniformis. *Banks and Sol. Mss. in Bibl. Banks.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* 1826, Bay of Islands.—*A. Cunningham.*—1834, *R. Cunningham.*

GENTIANEÆ, *Juss.*

1. Gentiana, *L.*

398. *G. saxosa*; corollis quinquefidis campanulatis, floribus longe pedunculatis subumbellatis, foliis caulinis subremotis spathulatis carnosis glabris, radicalibus approximatis. *Forst. Prodr. n.* 132. *A. Rich. Fl. Nov. Zel. p.* 202. *Willd. Sp. Pl.* 1. *p.* 1357.

New Zealand (Middle Island). On rocks washed by the sea, Dusky Bay. —1773, *G. Forster.*—1791, *A. Menzies.*

399. *G. montana*; corollis quinquefidis campanulato-infundibuliformibus, floribus pedunculatis subcorymbosis solitariisve, foliis caulinis remotis sessilibus ellipticis ovatisve, infimis approximatis basi attenuatis. *Br. Prodr.* 1. *p.* 450. *Forst. Prodr. n.* 133. *A. Rich. Fl. Nov. Zel. p.* 203. *Willd. Sp. Pl.* 1. *p.* 1334.

New Zealand (Middle Island). On the bare and bleak summits of the loftiest mountains.—1773, *G. Forster.*

2. Sebæa, *Soland. R. Br.*

400. *S.? gracilis,* corollis quinquefidis, calycis carinis simplicibus, foliis ovato-oblongis obtusiusculis enerviis, caule gracili tetragono membranaceo, capsula cylindrica.

New Zealand (Northern Island). In bogs at Mangamuka, Hokianga.—1834, *R. Cunningham.*

I have referred this slender plant to *Sebæa,* notwithstanding the spirally twisted anthers, *post anthesin*; the capsule being bilocular and margins of the valves inflexed. It differs from *S. ovata,* Br. in having a long cylindrical capsule, leaves without defined nerves, and a habit altogether more slender.

LOGANIEÆ, *R. Br. in Flind. Voy.*

Von Mart. Nov. Gen. & Sp. Pl. 2. *p.* 133.

Flos anisomerius. *Calyx* liber quinquepartitus. *Corolla* limbo æquali, seu inæquali æstivatione convolutiva. *Stamina* e *corolla* isogenea quinque (vel unum). *Pollen* vittato-trilobum (in *Pagamea*). *Stylus* insertus? *Stigma* simplex. *Capsula* bilocularis, placentis originatus vel tandem liberis; aut drupa mono-vel dipyrena, pyrenis mono-dispermis. *Albumen* carnosum vel cartilagineum. *Embryo* orthotropus, *Martius.*

1. Geniostoma*, *Forst.*

(Anasser, *Juss.* Aspilobium, *Soland.*)

Calyx quinquefidus persistens. *Corolla* tubulosa vel subcampanulata fauce barbata, limbo quinquepartito, laciniis incurvatis vel reflexis. *Stamina* 5, filamenta brevissima in fauce inserta. *Antheræ* biloculares. *Stigma* capitatum. *Ovarium* biloculare. *Capsula* 2-locularis, bivalvis, valvis integris, marginibus inflexis angustis insertis placentis duabus invicem cohærentibus, et post dehiscentiam valvularum persistentibus. *Semina* numerosa.—Arbores *vel* frutices. Folia *opposita, petiolata,*

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* The other species may be thus distinguished:

G. rupestre, Forst., arboreum, foliis oblongo-lanceolatis acuminatis concoloribus, corolla laciniis involutis, stigmate capitato sublamelloso.

Hab. In Insula Tanna. *G. Forster.*

G. borbonicum, fruticosum, foliis ovatis obtusiusculis.—Anassera borbonica. *Lam. Illustr.* 1. *p.* 40. *Rœm. et Sch. Syst. Veg.* iv. *p.* 204. *Pers. Syn.* i. *p.* 264.

Hab. In Insula Borbonia. *Commerson.*

stipulata, integra, venosa; *stipulæ in vaginas intrapetiolares connatæ.* Flores *axillares, subverticillati, cymosi.* Pedunculi *subsimplices, filiformes, bracteis binis medio instructi.*

401. *G. ligustrifolium*, fruticosum, foliis ellipticis ovatisve acuminatis subtus discoloribus, laciniis corollæ reflexis, stigmate depresso-capitato.—G. rupestris. *A. Rich. Fl. Nov. Zel. p.* 207. *non Forst.*—Aspilotum lævigatum. *Banks et Sol. Mss. Hunghi hunghi* Incol. *R. Cunn.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* In dry woods, Bay of Islands.—1826, *A. Cunningham.*—1827, *D'Urville.*—1834, *R. Cunningham.*

APOCYNEÆ, *R. Br.*

1. Parsonsia, *Br.*

402. *P. heterophylla*; paniculis terminalibus, tubo corollæ laciniis calycis triplo longiore, foliis ovato-lanceolatis integerrimis mucronatis vel elongato-lanceolatis attenuatis repandis, ramulis pubescentibus. Periploca capsularis. *Forst. A. Rich. Fl. Nov. Zel. p.* 205.—*Pi* Incolarum.

New Zealand (Northern Island). Shady woods at Wangaroa.—1826, *A. Cunningham.* At Hokianga, &c.—1834, *R. Cunningham.*

Upon comparing specimens of this plant recently gathered with authentic samples of *Periploca capsularis*, Forst. (in the Banks. Herb.) they appear identically the same species. Yet the latter is described by its discoverer (Prodr. n. 126) as having small flowers in axillary racemes shorter than the leaves, and the tube of the corolla shorter than the segments of the calyx. According to Sprengel, Forster's plant is identical with *Echites corymbosa* (*Jacq. Amer.*)

OLEINEÆ, *Hoffmansegg & Link.*

Olea, *L.*

403. *O. apetala, Vahl. Endl. Prodr. Fl. Norf. p.* 56. *Rœm. et Sch. Syst. Veg.* i. *p.* 71. *Excl. syn. Andrewsii.*

New Zealand (Northern Island). A tree 25 feet high, on the banks of rivers, &c.—1769, *Sir Jos. Banks.*—1826, *A. Cunningham.*

The iron wood of the earlier colonists on Norfolk island, where it attains a height of forty feet.

SAPOTEÆ, *Juss.*

Achras, *L.*

404. *A. costata. Endl. Prodr. Fl. Norf. p.* 49.

New Zealand (Northern Island). A small tree between the villages of Ngaire and Wainai, opposite the Cavallos Isles, off the east coast.—1833, *R. Cunningham.*

Obs. The specimens with which I have been furnished, without fructification, have been compared with those indigenous to Norfolk Island; and so far as the venation, general structure and figure of

the leaves have enabled me to determine, the New Zealand sea coast plant is identical with that elaborately described by M. Endlicher from Norfolk Island.

MYRSINEÆ, *R. Br.*

Myrsine, *L.*

405. *M. Urvillei*; glabra, foliis ovatis obtusis integris (undulatis) pellucido-punctatis, floribus subsessilibus fasciculatis (4) 5-andris polygamis, lobis calycinis minimis dentiformibus, antheris sessilibus ovoideis. *DC.* (*rev. Nat. Ord. Myrs.*) *in Linn. Tr. v.* 17. *p.* 105.—M. undulata. *A. C. Mss.* 1826.—Merista lævigata. *Banks et Sol. Mss.* 1769.—Suttonia australis. *A. Rich. Fl. Nov. Zel. p.* 349. *t.* 38. *Tepan* Incol.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* In dry woods, Bay of Islands.—1826, *A. Cunningham.* (Middle Island) Tasman's Bay. 1827, *D'Urville.*

406. *M.? divaricata*; ramis valde divaricatis arcuatis dependentibus glabris, foliis (semiuncialibus ad extremitatem ramulorum 2—3) late obcordatis seu emarginatis retusis coriaceis venosis, margine incrassatis, paginisque punctatis, punctis pellucidis rubescentibus, lobis calycinis (quaternis) ovatis obtusis glabris, bacca "globosa" pedicellata nigro-punctata.

New Zealand (Northern Island). A shrub found at the head of the Wycaddy river, Bay of Islands; also near the mission station on the Hokianga. —1834, *R. Cunningham.*

EPACRIDEÆ, *R. Br.*

1. Cyathodes, *Labill.*

407. *C. acerosa*, foliis lineari-oblongis linearibusve (semiuncialibus) patulis cuspidatis subtus glaucis 3—5-nerviis, nerviis extimis pectinatis ramulosis, margine ciliatis. *R. Br. Mss. Rœm. et Sch. Syst. Veg.* iv. *p.* 473.—Styphalia acerosa. *Banks et Sol. Mss.*—Leucopogon Forsteri. *A. Rich. Fl. Nov. Zel. p.* 216.—Epacris juniperina. *Forst. Prodr. n.* 71.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Summits of hills Wangaroa.—1826, *A. Cunningham.* (Middle Island), Astrolabe harbour.—1827, *D'Urville.*

2. Leucopogon, *R. Br.*

408. *L. fasciculatus*, spicis aggregatis solitariisve nutantibus, ovariis trilocularibus, drupis globosis, foliis lanceolatis planiusculis 5-nerviis, margine serrulatis, ramulis pubescentibus. *A. Rich. Fl. Nov. Zel. p.* 215.—Epacris fasciculata. *Forst. Prodr. n.* 72.

New Zealand (Northern Island). A large shrub in close forests. Kana Kana river, Bay of Islands.—1826, *A. Cunningham.* (Middle Island).—1773, *G. Forster.*

409. *L. Fraseri*, pumilus, pedunculis brevissimis erectis unifloris, foliis confertis imbricatis adpressis erecto-patulisve obovato-oblongis convexiusculis mucronatis subtus striatis, marginibus cartilagineis ciliatis scabris, ramulis tenuissime pubescentibus.

New Zealand (Northern Island). Among ferns on the hills near the Bay of Islands.—1820, *C. Fraser.*—1834, *R. Cunningham.*

3. Pentachondra, *R. Br.*

410. *P. pumila. Br. Prodr.* i. *p.* 549. *Rœm. et Sch. Syst. Veg.* iv. *p.* 487. *A. Rich. Fl. Nov. Zel. p.* 217.—Epacris pumila. *Forst. Prodr. n.* 70. *Linn. Suppl. p.* 138. *Pers. Syn.* i. *p.* 174.

New Zealand (Middle Island), summits of the bleakest and barest mountains.—1773, *G. Forster.*

Obs. Caules subpalmares, erecto-patentes, filiformes, foliosi, ex eadem radice plures, basi aphylli subterranei, vix ramosi. *Folia* minima, ovata, acuta, integerrima, 6—7-nervia, umbilicata, apice cartilagineo rubro. *Flores* solitarii in apice ramulorum sessiles. *Forst.*

4. Epacris, *Smith, Labill.*

411. *E. pauciflora*, foliis rhombeo-ovatis subacuminatis erectis concavis imbricatis crassis 3-nerviis muticis, floribus solitariis axillaribus pedicellatis, pedicellis multibracteatis, calycibus acutis tubum corollæ superantibus, staminibus inclusis. *A. Rich. Fl. Nov. Zel. p.* 213.

Toé-toé Incol. see *D'Urville.—Kowangatura. R. Cunningham.*

New Zealand (Northern Island). Shores of the Bay of Islands in open heaths.—1826, *A. Cunningham.*—1827, *D'Urville.*

5. Dracophyllum, *Labill.*

412. *D. latifolium*; arboreum, foliis linearibus valde attenuatis (sesquipedalibus) basi dilatatis vaginantibus, paniculis terminalibus ramosis.—Epacris latifolia. *Banks et Sol. Mss.*

New Zealand (Northern Island). Dry woods on the Kana Kana river, Bay of Islands.—1769, *Sir Jos. Banks.*—1826, *A. Cunningham.*

413. *D. longifolium*, arboreum, foliis lineari-lanceolatis acuminatis (sæpe in ramis junioribus spithamæis) basi dilatatis vaginantibus, racemis lateralibus simplicibus reticulatis. *R. Br. Mss. A. Rich. Fl. Nov. Zel. p.* 219. *Rœm. et Sch. Syst. Veg.* iv. *p.* 385.—Epacris longifolia. *Forst. Prodr. n.* 68.

New Zealand (Middle Island). In woods.—1773, *G. Forster.*

414. *D. rosmarinifolium*, fruticosum, foliis linearibus rigidis erectis (sexquiuncialibus) apice obtusis basi dilatatis vaginantibus, floribus axillaribus solitariis. *R. Br. A. Rich. Fl. Nov. Zel. p.* 200. *Rœm. et Sch. Syst. Veg.* iv. *p.* 385.—Epacris rosmarinifolia. *Forst. Prodr. n.* 69.

New Zealand (Middle Island). On the summits of the highest mountains. —1773, *G. Forster.*

415. *D. Urvillianum*, fruticosum, foliis fasciculatis linearibus acutis rigidis, margine retrorsum scaberulis basi dilatata vaginantibus floribus 2—4-spicatis, squamulis oblongo-lanceolatis acutis ciliatis, limbi corollæ laciniis ovali-acuminatis. *A. Rich. Fl. Nov. Zel. p.* 221.—D. attenuatum. *A. C. Mss.* 1826.

New Zealand (Northern Island). Open fern grounds on the shores of the Bay of Islands.—1826, *A. Cunningham.* (Middle Island), Tasman's Bay on rocks.—1827, *D'Urville.*

416. *D. Lessonianum*, foliis fasciculatis longioribus linearibus acutis subulatis semiteretibus glabris retrorsum scaberulis basi dilatatis subciliatis, floribus 6—8 alternis pedicellatis in spicam terminalem dispositis, squamulis 3—4 longitudine calycis longe acuminatis sepalis ciliatis longitudine corollæ, limbi laciniis oblongo-lanceolatis. *A. Rich. Fl. Nov. Zel. p.* 223.—D. rosmariniforme. *R. C. Mss.* 1834.

New Zealand (Northern Island). Banks of the Keri-Keri river, Bay of Islands.—1834, *R. Cunningham.* (Middle Island,) on rocks.—1827, *D'Urville.*

ERICEÆ, *R. Br.*

Gaultheria, *L.*

417. *G. antipoda*, caule fruticoso ramoso ramis lanuginosis, foliis obovati-orbiculatis obtusis serratis glabris, floribus axillaribus solitariis pedicellatis. *A. Rich. Fl. Nov. Zel. p.* 211. *Forst. Prodr. n.* 196. *Willd.* &c.

Ton-aye Incol., *D'Urville.*—*Kehuhutia, R. Cunningham.*

New Zealand (Middle Island).—1773, *G. Forster.* (Northern Island). Open fern lands, Bay of Islands.—1826, *A. Cunningham.*—1827, *D'Urville.*—1834, *R. Cunningham.*

418. *G. rupestris*, (R. Br.) caule suffruticoso ramoso, ramulis verrucosis non hispidis, foliis elliptico-lanceolatis serrulatis utrinque glabris (uncialibus) racemis axillaribus terminalibusve simplicibus folio longioribus, rachi pedicellisque pilosis.—Andromeda rupestris. *Forst. Prodr. n.* 195. *A. Rich. Fl. Nov. Zel. p.* 208. *t.* 27.

New Zealand (Middle Island). In swamps and on wet rocks.—1773, *G. Forster.*

419. *G. fluviatilis*, caulibus suffruticosis procumbentibus, ramis crinitis, foliis lineari-lanceolatis obtuse acuminatis petiolatis (semiuncialibus) margine revolutis remote serratis, serraturis apiculoque obtusis callosis, supra tenuiter pilosis, subtus rugoso-striatis, racemis terminalibus folio multoties longioribus, pedicello bracteatis villosis.—Andromeda rupestris. *R. C. Mss.* 1834, *non Forst.*

New Zealand (Northern Island). In the pebbly bed of the Keri-Keri river near the Great Fall, Bay of Islands.—1834, *R. Cunningham.*

CAMPANULACEÆ, *R. Br.*

1. Wahlenbergia, *Schrad.* (Campanula, *sp. L.*)

Calyx 3—5-fidus. *Corolla* campanulata, basi tubulosa, limbo 3—5-fida. *Stamina* 3—5, inæqualia, *filamenta* basi simplicia. *Stigma* obtusum, trilobum, barbatum. *Capsula* trilocularis, univalvis, apice foramine triplici hians. *Dissepimenta* utrinque placentifera. *Semina* indefinita, pendula.

420. *W. gracilis*, caule erecto gracili tereti a basi ramoso glabro aut piloso, foliis linearibus integris aut dentatis, glabris aut pilosis, floribus terminalibus ad apicem ramorum solitariis 5-fidis, corolla ovario duplo triplove longiori. *A. Rich. Fl. Nov. Zel. p.* 225.—Campanula gracilis. *Forst. Prodr. n.* 84. *Br. Prodr.* i. *p.* 561. *Rœm. et Sch. Syst. Veg.* v. *p.* 97. *Bot. Mag. t.* 691.—C. polymorpha, *var. Sol. Ms. in Bibl. Banks.*

Punai-uou Incol., *R. Cunn.* *Kouletao, D'Urville.*

Obs. Species polymorpha valde variabilis, cujus hujus varietates e Nova Zelandia et Nova Caledonia, in Herb. Banks. vidi. *R. Br.*

New Zealand (Northern Island). Among ferns on the hills, Bay of Islands, &c.—1834, *R. Cunningham.* (Middle Island).—1773, *G. Forster.* Astrolabe Harbour.—1827, *D'Urville.*

2. Lobelia, *L.*

421. *L. alata. Br. Prodr.* i. *p.* 562. *A. Rich. Fl. Nov. Zel. p.* 227. *Rœm. et Sch. Syst. Veg.* v. *p.* 68. *Labill. Nov. Holl.* i. *p.* 51. *t.* 72.

Pourao Incol. sec. *D'Urville.—Wae-wae-Kou-kou, R. Cunningham.*

New Zealand (Northern Island). Sea coast near the Bay of Islands, on rocks.—1834, *R. Cunningham.* (Middle Island), Astrolabe Harbour.—1827, *D'Urville.*

422. *L. angulata. Forst. Prodr. n.* 309. *Willd. Sp. Pl.* i. *p.* 951. *Rœm. et Sch. Syst. Veg.* v. *p.* 65. *A. Rich. Fl. Nov. Zel. p.* 227.

New Zealand (Middle Island).—1773, *G. Forster.* (Northern Island.) Valley of Wangaroa.—1826, *A. Cunningham.*

423. *L. littoralis* (*R. Cunn.*) procumbens, glaberrima, caulibus adscendentibus gracilibus, foliis subrotundo-ovatis grosse dentatis, pedunculo ebracteato florifero plus duplo brevioribus floribus axillaribus solitariis pedunculis fructiferis valde elongatis.

New Zealand (Northern Island). On the shores of the Keri-Keri and Kana-Kana rivers, Bay of Islands.—1834, *R. Cunningham.*

424. *L. submersa* (*R. Cunn.*) repens, cæspitosa, radicans, foliis (semiuncialibus) lineari-spathulatis obtusis integerrimis subrepandisve infra medium attenuatis piligeris, pedunculo ebracteato parum longioribus, staminibus epipetalis.

New Zealand (Northern Island). In stagnant water, lodged in basins of the rock in the bed of the Keri-Keri river, Bay of Islands.—1834, *R. Cunningham.*

425. *L. physaloides,* suffruticosa glabra, caule anguloso subramoso, foliis ovato-oblongis longe petiolatis acutis inæqualiter serratis, racemis terminalibus nutantibus laciniis calycinis linearibus dimidium corollæ vix æquantibus, capsula globosa torulosa.

Odu vel *Oru* Incol. vulgo dicitur.

New Zealand (Northern Island). In damp woods at Wangaroa, Matauri, &c., Bay of Islands.—1834, *R. Cunningham.*

Planta (in horto) vix ad basin suffruticosa, duo vel tripedalis, ramulis rotundato-angulatis purpureo-luridis. *Folia* alterna, ovata, acuta, valde prominenti-venosa, petiolata, 3—4 uncias longa, inæqualiter serrata, serraturis glanduloso-callosis, petiolis biuncialibus, supra canaliculatis, basi incrassatis decurrentibus. *Racemi* divisi, 6—8-flori. *Pedunculi* alterni unciati, bracteis foliaceis linearibus suffulti. *Calycinæ laciniæ* lineari-lanceolatæ, subulatæ, acutæ, corolla plus duplo breviores. *Corolla* cœrulea, unciam longa, laciniis lanceolatis attenuatis lineatis stamina æquantibus. *Antheræ* exsertæ, apice penicillatæ. *Stigma* dila-

tatum, bilobum, lobis rotundatis supra convexis glabriusculis, subtus concavis dense villosis.

Obs. In horto regio Kewensi colitur, ubi quotannis floret.

STYLIDEÆ.

1. Stylidium, *Swartz. Labillardière.*

426. *S. spathulatum. Br. Prodr.* i. *p.* 569. *A. Rich. Fl. Nov. Zel. p.* 229.

New Zealand (Middle Island). Tasman's Bay (lat. 40½ S.).—1827, *D'Urville.*

This plant, a native of the south coast of Australia, is here admitted as indigenous also to New Zealand, solely on the authority of M. Achille Richard, who has described a plant which was found on the shores of Tasman's Bay in the voyage of L'Astrolabe, and which he has referred to *Stylidium.* He says, "Nous avons rapporté au *Stylid. spathulatum* de Brown un *seul petit échantillon* de ce genre qui a été recueilli par le capitaine lui-même à la baie Tasman. La seule différence que notre échantillon nous ait présentée, c'est que la hampe est légèrement poilue dans sa partie inférieure, tandis que, selon la phrase du célèbre auteur du 'Prodrome de la Nouvelle Hollande,' elle serait tout-à-fait glabre. Mais cet différence est de trop peu d'importance pour former un caractère distinctif." *A. Rich. l. cit.*

Of this genus, no species was detected in New Zealand, either in the several voyages of Cook or in that of Vancouver, and the *order* has hitherto been represented on those islands by the following genus *only.*

2. Forstera, *L. Forster.*

427. *F. sedifolia. L. fil. Willd. Sp. Pl.* 4. *p.* 149. *Pers. Syn.* 2. *p.* 211. *A. Rich. Fl. Nov. Zel. p.* 229. *Forst. in Nov. Act. Ups.* 3. *p.* 184. *tab.* 9.

New Zealand (Middle Island), summits of mountains at Dusky Bay.—1773, *G. Forster.*—1791, *Arch. Menzies.*

Obs. Radix perennis. *Caulis* adscendens, palmaris, radicans. *Folia* linearia, carnosa, obtusa. *Pedunculi* solitarii, uniflori, longissimi. *Flores* albi, fauce rubescente.

GOODENOVIÆ, *R. Br.*

1. Goodenia, *Smith.*

428. *G. repens. Br. Prodr.* 1. *p.* 579. *Labill. Nov. Holl.* 1. p. 53. *tab.* 76. *A. Rich. Fl. Nov. Zel.* p. 228. *Rœm. et Sch. Syst. Veg.* 5. *p.* 31.—G. radicans. *Rœm. et Sch. Syst. Veg.* 5. *p.* 32.—G. littoralis. *Br. Gen. Remarks in Flinders's Voy.* 2. p. 561.

Réko-réko Incol. *D'Urville. Raumauga,* nomen vernaculum sec. *R. Cunn.*

New Zealand (Northern Island). Saltwater creeks, saltwater marshes, &c., Wangaroa.—1834, *Rich. Cunningham.* (Middle Island). Sandy shores of Astrolabe Harbour.—1827, *D'Urville.*

2. Scævola, *L.*

429. *S.? Novæ Zelandiæ,* calyce (quinquepartito?) ovario multo breviore, foliis obovatis obtusis valde reticulatis glabris distanter denticulatis, axillis barbatis.

New Zealand (Northern Island). On the sea coast, opposite the Cavallos Isles.—1834, *R. Cunningham.*

From the very imperfect specimens I possess, the genus of this remarkable plant cannot be satisfactorily determined. The presence, however, of barbated stipuliform appendages at the axillæ, as also of the bilocular fruit, have induced me to place it here rather than with *Euphorbiaceæ,* with which habit, &c., seem to indicate its affinity.

[To be continued.]

VIII.—*An attempt to ascertain the Fauna of Shropshire and North Wales.* By T. C. Eyton, Esq., F.L.S.

[Continued from vol. i. p. 293.]

No. III. *Aves.*

Charadrius pluvialis, Linn. (Golden Plover.) Has several times occurred in the district during winter; is said to breed on the mountains above Chirk Castle.

Charadrius Hiaticula, Linn. (Ringed Plover.) Common in the neighbourhood of Holyhead and Rhoscolyn, where I have several times found the eggs.

Vanellus cristatus, Meyer. (Lapwing.) Common both during summer and winter.

Hæmatopus ostralegus, Linn. (Oyster Catcher.) Common on the Welsh coast. A remarkable change in the form of the bill takes place in the young of this species during its progress towards maturity. On leaving the egg the bill is not very unlike in form to that of the golden Plover, and well adapted for picking up minute insects and mollusca, at that time its natural food; indeed, had it the perfect wedge-shaped bill of the adult, the strength necessary to divide as it were the limpet from the rock would be wanting.

Squatarola cinerea. (Grey Squatarole.) One specimen has been sent to me obtained during last winter near Holyhead.

Ardea cinerea, Linn. (Common Heron.) Breeds in several localities within the district; numbers of nests may be seen on the precipitous rocks in the neighbourhood of the South Stack lighthouse; when the young are nearly fledged, if a noise be made under the nests by striking the oars against the side of the boat, they will often spring out and fall into the sea.

Ardea (*Botaurus*, Steph.) *stellaris*, Ray. (Bittern.) Several specimens have occurred. A hatch of these birds came off at Cosford Pool, near Nufnal, in 1836.

Nycticorax europæus, Steph. (Night Heron.) Two specimens have occurred within the district; one killed near Wroxeter in the young state of plumage, now in the possession of Mr. Stanier of that place; the second on an estate belonging to Bukeley Owen, Esq. in Anglesea, in the adult plumage.

Platalea Leucorodia, Linn. (Spoonbill.) I am informed that a specimen is in the collection of a gentleman near Aberystwith, killed near that place.

Scolopax (*Numenius*, Lath.) *arquata*, Linn. (Curlew.) Breeds on Whixan moss in Shropshire, and in the neighbourhood of Holyhead.

Scolopax (*Numenius*, Lath.) *Pheopus*, Linn. (Whimbrel Curlew.) A specimen is in my collection killed at Betton Pool, near Shrewsbury.

Scolopax Rusticola, Linn. (Woodcock.) Common.

Scolopax Gallinago, Linn. (Snipe.) Common.

Scolopax Gallinula. (Jack Snipe.) Common.

Limosa rufa. (Black-tailed Godwit.) Several specimens have occurred.

Tringa subarquata, Gmel. (Pigmy Curlew.) A specimen in my collection killed Sept. 1836 on Shrewsbury race-course.

Tringa alpina, Linn. (Dunlin.) Common everywhere on the Welsh coast during summer, and often killed inland during the winter months.

Tringa Schinzii, ——. (Schinz's Sandpiper.) A specimen killed near Stoke Heath is in Sir Rowland Hill's collection.

Tringa maritima, Gmel. (Purple Sandpiper.) One specimen only, which has been received from Holyhead.

Phalaropus lobatus, Lath. (Grey Phalarope.) Two or three specimens have occurred; one is in the possession of the Rev. John Roch of Clungunford; another killed near Montford-bridge is in my own.

Tringa (*Strepsilas*, Ill.) *Interpres*, Linn. (Turnstone.) Common on the Anglesea coast.

Totanus Calidris, Linn. (Redshank.) I once killed several out of a flight of at least fifty near Rhoscolyn.

Totanus Ochropus, Linn. (Green Sandpiper.) Often killed inland as well as on the coast.

Totanus Hypoleucos, Linn. (Common Sandpiper.) Common on the coasts and islands.

Rallus aquaticus, Ray. (Water Rail.) Common on the wild moors.

Crex pratensis, Bechs. (Corn Crake.) Common during the summer months.

Gallinula chloropus, Ray. (Moor Hen.) Common.

Fulica atra, Ray. Common.

Podiceps cristatus, Linn. (Crested Grebe.) Common on the meres in the neighbourhood of Ellesmere, where it breeds; its food is entirely vegetable. I have several times attempted to keep this bird alive in confinement, but never with success. Both males and females possess two pairs of muscles of voice similar to those described by Mr. Yarrell to exist in the Indian Crowned Pigeon.

Podiceps minor, Lath. (Lesser Grebe.) Common.

Colymbus glacialis, Linn. (Northern Diver.) Several specimens have occurred both on the meres of Shropshire and on the Severn, during winter. The trachea of this as well as the two following is acted upon by two pairs of muscles of voice similar to those found in the grebe, but stronger.

Colymbus arcticus, Ray. (Black-throated Diver.) One specimen occurred last winter; the trachea as in the last.

Colymbus septentrionalis, Linn. (Red-throated Diver.) Occurs every winter: trachea as in the two preceding.

Uria Troile, Briss. (Guillemot.) Common. We are convinced that *U. Brunnichii* is not distinct.

Fratercula arctica, Steph. (Puffin.) Breed on Priestholm island off Beaumaris in the greatest abundance; also at the Skerries off Holyhead.

Alca Torda, Linn. (Razor Bill.) Common on the coast.

Procellaria (*Thalassidroma,* Leach.) *pelagica,* Linn. (Stormy Petrel.) Two or three specimens have occurred both inland and on the coast.

Thalassidroma Leachii, Steph. (Leach's Petrel.) One specimen only has occurred; it was killed on the Severn near Montford-bridge, and is in my collection.

Lestris, Temm. Birds of this genus are said to have occurred, but I have never been able to obtain any for examination.

Gavia (*Rissa,* Leach.) *cinerea,* Briss. (Kittiwake.) Common.

Larus canus, Linn. (Common Gull.) Common.

Larus argentatus, Brun. (Herring Gull.) Breeds plentifully along the whole line of the Welsh coast.

Larus fuscus, Linn. (Lesser Black-backed Gull.) One specimen is in my collection: killed near Holyhead.

Larus marinus, Linn. (Greater Black-backed.) Said to breed near the South Stack lighthouse, but I have never observed it. My specimen was killed feeding at a dead horse near Holyhead.

Chroicocephalus ridibundus, nobis. (Laughing Gull.) Common.

Chroicocephalus capistratus, nobis. (Brown-headed Gull.) One specimen only has occurred and is in my collection: killed near Bangor.

Sterna arctica, Temm. (Arctic Tern.) Breed on the Skerries: the trachea possesses a second pair of muscles of voice besides the usual sterno-tracheal ones corresponding to the fifth pair of Mr. Yarrell found in the Raven.

Sterna marina, Ray. (Common Tern.) Also breeds at the Skerries.

Sterna Dougallii, Mont. (Roseate Tern.) One specimen is in my possession, killed near Longden mill, three or four years ago.

Phalacrocorax Carbo, Auct. (Common Ray.) Breeds in numbers on Holyhead mountain.

Phalacrocorax Graculus, Lath. (Crested Cormorant.) One or two nests of this species are found every year on Cardinal's Point; both this and the foregoing possess two pairs of muscles of voice, the first, the usual sterno-tracheal ones, the second continued from the point at which the first pair branch off to the upper rings of the bronchiæ, between which and the last tracheal ring is situated a membrane stretched and able to be rendered more or less tense by the action of the muscle.

Sula Bassana, Briss. (Gannet.) I never heard but of the occurrence of one specimen in the district; it was picked up exhausted, in the neighbourhood of Holyhead.

Mergus Merganser, Ray. (Common Merganser.) Often killed on the Welsh lakes and on the Severn during hard weather.

Mergus albellus, Linn. (Smew.) Found in the same localities as the preceding.

Mergus cucullatus, Linn. (Hooded Merganser.) One specimen is in my collection, killed on the Menai Straits during the winter of 1834; it is a young male of the year.

Mergus Serrator, Linn. (Red-breasted Merganser.) One or two specimens occurred last winter on the Severn.

Clangula chrysophthalmos, Steph. (Common Golden Eye.) Common on the coast, and occasionally found on inland waters during winter.

Fuligula cristata, Steph. (Crested Pochard.) Also found on the coast during winter.

Fuligula Marila, Steph. (Scaup Duck.) Not nearly so common as the other species of the genus, and never killed inland.

Fuligula ferina, Steph. (Red-headed Pochard.) Found with the preceding always on the sea.

Melanitta nigra, Bore. (Black Scoter.) Several times obtained from the coast. The female of this species has the trachea acted upon by two pairs of muscles of voice.

Anas Boschas, Linn. (Common Wild Duck.) Common.

Rhynchaspis clypeata, Steph. (Shoveller.) Not uncommon both on the coast and inland during winter.

Querquedula Crecca, Steph. (Common Teal.) Common in the district, and occasionally breeds on the Welsh lakes.

Mareca fistularis, Steph. (Widgeon.) Common.

Dafila caudacuta, Steph. (Pintail.) Not uncommon on the Welsh coast during winter; the only specimen I ever heard of being killed inland, was obtained during the winter 1832–3 on Ruyton brook.

Tadorna Bellonii, Steph. (Common Shieldrake.) I have more than once received this bird from Holyhead. A specimen is in the collection of the Shropshire and North Wales Natural History Society, killed near Ecleshall, which is the only one I ever heard of being killed inland. In the neighbourhood of Holyhead it is called the Stranger Duck, and breeds on a point jutting out to sea between Rhoscolyn and Abermenai, in its usual place, rabbits' holes.

Cygnus ferus, Ray. (Wild Swan.) Upwards of twenty specimens of this beautiful bird were killed during last winter, 1837, in Shropshire.

Cygnus Bewickii, Yarrell. (Bewick's Swan.) One specimen was killed two or three years ago on the upper part of the Severn; but though so many of the common species were met with last winter, not one of *C. Bewickii* occurred.

Anser Segetum, Steph. (Bean Goose.) Common during hard winters on the Weald moors and Ruggymoor.

Anser Erythropus, Flem. (Laughing Goose.) Has occasionally been killed in the district.

Bernicla Leucopsis, Bechst. (Common Bernacle.) Several times received from Holyhead during winter, and once observed on the river or creek separating Holyhead Island from Anglesea during summer.

IX.—*Information respecting Botanical Travellers.*

Unio Itineraria.

The following appeal to the friends of natural history, and of botany in particular, has recently been published and circulated by the Directors of that highly useful Society the "Unio Itineraria," and we trust it will not be made in vain. This Society affords an inestimable opportunity for botanists to enrich their herbaria with plants of great rarity from various parts of the world, collected at much expense, at great risk, preserved with the greatest care, and named by naturalists who are competent to this task, and we do trust that some of our readers will be induced by the following statement to come forward and encourage so useful and scientific an institution. Our friend, John Hunneman, Esq., 9 Queen Street, Soho, London, will forward the names and subscriptions to the Directors, and will receive and distribute the different collections, so that those who may wish to possess these plants will be put to no trouble on this account.—Sir W. J. Hooker.

Particulars respecting M. Schimper's Abyssinian Journey.

The important results of the journey to Egypt and Arabia encouraged us to extend the original plan, so as, if possible, to embrace Abyssinia, according to our notice of December, 1836. This country is so interesting, whether as regards its geographical situation or physical structure, the latter having procured it the name of the African Switzerland, and has hitherto been so superficially examined, that we hoped it would excite the curiosity of scientific individuals in general, as well as of the members of this Society; and trusting to receive the needful participation and support, we provided the traveller with such a sum of money as appeared requisite. But although our hopes were tolerably well fulfilled, so far as regarded the members of the *Unio*, and we received sufficient subscriptions to cover the first outlay, as originally calculated, yet it shortly proved that the expedition was attended with far heavier cost than had been anticipated. Circumstances of detention arose:—the traveller found it needful to provide himself with presents, wherewith he might propitiate favour and obtain leave to proceed. Sometimes indeed the offering of these is no matter of choice, but of compulsion. Thus, even before entering the country which he was to explore, our traveller was obliged to have recourse to an English Consular Agent, who kindly assisted him in his present necessities with money upon our credit. Schimper is now in the interior of the country, at Adowa in Abyssinia. He has conciliated the favour of one of the

native princes, and, except as regards the important want of money, he is in a most favourable situation for exploring the whole territory. There is nothing to endanger his safety, and we confidently anticipate that the expectations of the subscribers will be amply realized, as this naturalist possesses a happy union of the mental and bodily properties requisite for his object, if he is furnished with the means of prolonging his stay and making excursions in the country.

We subjoin a short extract from Schimper's account of his progress. He took shipping in the middle of November, 1836, at Suez, for Djedda, whence, on the 19th of the following month, he pursued his course by water, and early in January reached Massava, which is a small island in the Red Sea, close by the coast of Abyssinia. There, unfortunately, a whole month's detention took place, owing to a quarrel which had just arisen between two Frenchmen, who resided in the neighbourhood, and some of the natives, which ended in one of the Abyssinians being shot. The Frenchmen fled, but the minds of the people were so much exasperated against all foreigners that the attempt to penetrate into the country would have been highly dangerous at that juncture. It was not till the 8th of February that Schimper could venture to enter the territory of Akiko, which he effected by purchasing the permission at considerable cost from the Naib there, a Bedouin prince, who appears to have shown himself a great extortioner. Thence his route lay to Haley, 60 miles further, but this being the very place where the murder was committed, our poor naturalist was exposed to such perils that he quitted the town as soon as he could *buy* leave to do so, leaving behind six camels' loads of his property: "these," he says, "were afterwards returned to me through the favour of King Ubie, governor of Tigre and king of Abyssinia, who received me in his tent and showed me much kindness, thanks to the very high recommendations which I carried from the Austrian General Consulate at Cairo." Schimper found it necessary to give presents to king Ubie, in order to ensure his continued protection: he also dined twice with him in his tent, accompanied by the Missionary Blumhardt, of Stuttgard, who is likewise settled at Adowa, with his companion in religious labour Isenberg. The latest accounts from our botanist state, that his labours, after he had succeeded in obtaining some money on our credit from Mr. Dumreicher, of Alexandria, have been attended with considerable success. It was his intention to commence in autumn a journey to the highest mountain of the Semen range, whose snowy peaks were in sight from Adowa, and to explore the country in all directions, as the season and climate permitted. Among the plants

which particularly struck him he mentions an arborescent *Euphorbia*, 12—20 feet high, which the inhabitants call *Koll-Quall*; it is probably *E. officinarum*, Linn. He had also noticed five different species of *Mimosa*, and thought by the aspect of the plants which he had already collected, to the number of about 12,000 specimens, that one-third of them might prove new. His hopes of performing much for the cause of science are high, provided they are not baffled by the want of pecuniary means, of which he sorrowfully complains, as likely to hasten him home. As matters now stand, our readers must perceive that it will either be necessary to aid the traveller liberally with such supplies as the cordial co-operation of the members of this Union can easily raise, without any considerable risk to their own interests, or else the enterprise must be abandoned. For our own parts, we take the liberty of reminding our friends that at the very outset we ran the chance of pecuniary loss for the benefit of the Society, and have at this very time afresh aided M. Schimper with a considerable sum for immediate use, which is not yet covered by the subscriptions of the Members, and of which, in strict justice, the burden ought not to lie upon us. During the course of the present year there has certainly been granted by the Governments of Wurtemberg and of the Grand Duchy of Baden no inconsiderable aid towards the expenses of this expedition; but the sums in question fall far short of covering the outlay already made, much more of enabling him to proceed with his investigations and his labours; and the liberality of the Grand Duke's royal Danish Consul at Alexandria, M. Dumreicher, who thrice, through the English Consular Agent at Djedda, advanced money to assist Schimper, while it argues the most obliging confidence in the members of the *Unio* to meet these engagements, and in Schimper to exert his best abilities in their service, still more powerfully binds the individuals whom he has obliged to come forward and relieve M. Dumreicher from this risk of loss.

The undersigned will on no account disown in any degree the debt which the *Unio* has thus incurred; they, on the contrary, would urge on the Members the advantages which they will severally derive from coming forward early to clear these engagements, inasmuch as they will have the first selection of the rarest and best plants, and will obtain them about one-third cheaper than any purchasers who present themselves at a future period. We would therefore again invite all the Members of this Society and every friend of botany to become contributors towards this expedition, and that, not only from motives of justice to the undersigned, but also for their own exclusive advantage. As it is calculated that M. Schimper will in these tro-

pical districts collect at least 2000 species (Mr. Ecklon collected thrice that number in the three years he spent in South Africa), it will be seen that a treble subscription of 60 florins will not meet the value of an entire collection made during the two or three years' absence of M. Schimper. But to those who subscribe 120 florins we will ensure to them the future collections at the same rate of subscription.

We think that the subscribers may rest assured, that whereas the century of species will cost them 15 florins (33 francs), those individuals who may apply afterwards will have to pay 20 florins (42 francs). Up to the present time we admit of contributors coming forward to the smaller amount of 50—60 florins: these, however, can only claim three or four centuries at the subscription price. We again venture to express our hope that such botanical friends as possess the means, particularly public cabinets of natural history and those individuals who have hitherto been members of the *Unio*, will not forsake us in this important undertaking; and especially that they will consider this journey as a national enterprise, which for the honour alike of country and of science they will do their best to promote.

As our traveller also collects zoological objects, especially bird-skins, fish, and shells, the amateurs of these respective departments of natural history may secure a proportion of them, according to their subscriptions, observing, however, that the contributions towards this journey have some analogy to stock, whose value rises and falls according to circumstances. The greater, however, be the assistance afforded to the traveller, to enable him to prolong his stay and in safety to prosecute his researches, the richer may the proceeds be expected to prove.

To those members who take an interest in the productions of the Georgian Caucasus, we beg to intimate that fresh packets have just arrived from M. Hohenacker, containing 200 species, most of which had not been previously sent, and of the rest only individual specimens. Particulars are mentioned in the Appendix.

Of the North American plants of the deceased Dr. Frank, there remain collections of 100 and of 200 specimens. These will be sold at 12 florins and 24 florins, after the period during which the subscription of 11 florins was admissible shall have closed.

Lastly, we are enabled to offer to the respected Members of the *Unio* and to other botanists, dried plants from New Holland, which the Royal Botanic Society of Ratisbon has transmitted to us for valuation and sale. They were collected by Dr. Lhotsky, at Sydney and Port Jackson, and are described by us and consigned to us on

commission. The collections of 100 and 200 species are respectively prized at 15 florins and 30 florins; and we beg to observe, that to those who do not already possess the collections of Sieber, they are highly interesting, and the more so as the specimens are incomparably more beautiful and complete than the relics which are still on sale of Sieber's plants.

PROFESSOR HOCHSTETTER,
DR. STEUDEL.

Esslingen by Stuttgard, Jan. 1838.

BIBLIOGRAPHICAL NOTICES.

Icones Fungorum hucusque cognitorum. Auctore A. C. J. Corda. Pragæ, 1837.

Though the present work is not wholly destitute of the faults which are chargeable against the other mycologic labours of the author, it is one of very great importance. If his matter is not always correct, nor his views judicious, we find much that is at least original; and there are many observations and discoveries which throw quite a new light on several obscure branches of mycology. It would indeed be difficult to point out any work of the same size which contains so much of interest. The price too is extremely moderate; and as the specific and generic characters and references to the dissections are in Latin, though the remarks are in German, it is generally accessible to botanists. It is much to be desired that the author will meet with sufficient encouragement to enable him to continue a work which, from the style in which it is got up, must necessarily involve a considerably outlay, and even more brilliant discoveries may be confidently expected in other branches of the science. At present there are few good figures of the fruit-bearing organs of fungi; and, from our own experience, we can bear witness that much remains to be done. Mycologists have till lately been in possession of instruments which can show only a part of the structure, and many of the more minute species have been very imperfectly investigated, nor have the differences, which exist at different periods of growth, received sufficient attention. Indeed the fructification of the typical group of fungi has been altogether misunderstood.

Among the points of most interest, we shall note the following, taken in the order in which they occur.

The author asserts that *Trichothecium roseum* is a parasite on hyphomycetous fungi, or *Mycelia*. *Trichothecium domesticum* is said to occur on the hyphasma of *Mucor Mucedo*. This hint is well worth

following up. We have long since been convinced that the commonly received notions of the structure in this genus are incorrect, and the published figures very insufficient. We cannot however agree, even if the author is correct (which is highly probable), that it has any affinity with *Puccinia,* much less that it belongs to that genus, with which he unites it.

To the correctness of the next point, viz. that *Sepedonium roseum* accompanies *Verticillum cylindrospora,* Corda, we can ourselves bear testimony. Whether it be a parasite or no demands further inquiry.

There are figures of some very interesting new species of *Torula,* and of some extraordinary productions nearly related to that genus.

Helicomyces is asserted to be parasitic on the hairs of *Sphæria exilis, Dematia, Helminthosporia,* &c., and destitute of any proper stroma. *Helicotrichum,* Nees, therefore, is, contrary to the opinion of Fries, a distinct genus.

Puccinia Bullaria is figured as a *Phragmotrichum.* If the analysis is correct, the species figured must be quite different from what we have now before us, which does not differ from other *Pucciniæ,* except in being more closely invested with the epidermis.

Under *Helminthosporium apiculatum,* a highly interesting analysis of the genus is given. The spore consists, 1st, of an outer light skin; 2nd, of an inner, hard, coloured, horny skin, which incloses a third, which, like the first, is light-coloured. Within this are the septa, which have a proper membrane, and are not united at all to the third coat, or connected with it. They inclose large drops of oil, with which they are also surrounded. The apiculus is formed of a proper skin, and merely adheres to the spore, without being clothed with any of its coats. The drops of oil are what are sometimes called sporidiola, and they require further investigation. We do not deny that the cells sometimes contain drops of an oily fluid, but that the so-called oil-drops are sometimes true reproductive bodies is quite certain. The distinction between the genera *Doratomyces* and *Stysanos* is well worth attending to, as it throws light upon a matter at present somewhat obscure. Some of the latter will probably be found to be mere anamorphoses of *Aspergilli.*

Chordostylum, Tode, an ill-understood genus, is shown to be allied to *Pilobolus.* The flocci of *Trichiæ* are shown to be spiral vessels, like the elaters of *Jungermannia.* The genus *Chætomium* is figured as ascigerous, a most interesting fact, which we can ourselves confirm. The matter, however, requires further attention. *Myxascia,* Berk., is probably only a correctly observed *Chætomium.*

The sporidia of *Chætomium murorum* have a chink on one side, like those of the *Sphæria pedunculata*, Dick., and *S. hippotrichioides*, Sow.

The true structure of *Sphæronema* is delineated in a species which grows upon the buds of *Dahlias*, which is almost identical with *S. blepharistoma*, figured in Mag. Bot. and Zool., vol. i.

The reproductive bodies of *Tuber* are beautifully figured, under *Tuber fuscum*. In the common truffle we find them just the same, and by no means such as represented by Turpin in his memoir on that genus.

The last illustration is perhaps the most important, being a complete confirmation of the views on the structure of hymenomycetous fungi, published in a late number of this journal*. It is most curious that Ascherson, Corda, Montague, Leveillè, Brogniart and Decaisne should almost at the same time have observed the true structure of the hymenium in typical fungi.

It will not be thought invidious, if after calling attention to so many points of interest, (and there are many which we have not noticed,) we point out a few matters which might mislead. The author is certainly too hasty in the proposing new species and genera: indeed, many of his species appear to be the conidia of other fungi, or anomalous forms of described species. *Bispora intermedia* appears to be a correctly drawn *Torula antennata*. *Halysium atrum* is *Spiloma melanopum*, E. B. t. 2358, which has been neglected by authors. Its nature is still doubtful. *Periconia byssoides* is either incorrectly drawn or is not the true plant of Nees, the flocci of which are articulated and the spores curiously granulated.

The species figured as *Stilba* appear to belong to other genera. *Stilbum crystallinum* is clearly *Aspergillus albus*, and *Stilbum vulgare* certainly not the true plant. *Stilbum nodosum* appears to be young *Aspergillus maximus*.

Other points might be noted, but we had rather again call the attention of our readers to the merits of the work, and recommend it very strongly to their patronage.

Commentationes de Leguminosarum Generibus. Auctore Georgio Bentham.

During an interesting and extensive tour lately made on the continent of Europe, our valued friend Mr. Bentham devoted his time, whether in the field or in the public and private museums, to the

* On the fructification of the Pileate and Clavate Tribes of Hymenomycetous Fungi, vol. i. p. 81.

study of botany, with that energetic zeal which marks his character, and which induces him to labour, not for his own improvement only, but for the public good. One of the results of this tour has been the publication (at Vienna) of a 4to *brochure*, of 100 closely printed pages, under the title above given. Here are included a great number of most valuable observations on many new genera and species of *Leguminosæ*, chiefly from the Herbaria of Munich and Vienna, where the collections were (as elsewhere) thrown open to him with a liberality which has called forth his grateful acknowledgements. His work, we are happy to learn from the preface, now that Mr. Bentham is returned to London, is but the forerunner of a more extensive one on this extensive family of plants.

The Natural Arrangement and Relations of the Family of Fly-Catchers or Muscicapidæ. By William Swainson, Esq.*

This work, one of the cheap and beautifully illustrated volumes of Sir William Jardine's Naturalist's Library, well sustains the character of that popular series. Mr. Swainson's talent as a zoological writer appears to be peculiarly fitted for works of this description,—his slight sketches combine the beauty of a work of art, with the distinctness and accuracy so requisite in subjects connected with natural history. The text is an extension of the author's remarks on this family, originally published in the Ornithological volumes of Lardner's Encyclopædia, and contains much useful information, conveyed in an agreeable manner, and illustrated by thirty accurately coloured plates, beautifully engraved by Mr. Lizars. The work is published at such a moderate price as to place it within the reach of any person wishing to pursue the study of natural history, but who may hitherto have been prevented by the high price at which books on such subjects are usually brought out.

Much, however, as we are pleased with the general execution of this little volume, we cannot but regret that Mr. Swainson has not been more accurate in the orthography of the scientific names.

The same volume also contains an interesting memoir and plate of Baron Haller, the poet, the physiologist, and the naturalist.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

April 4.—A paper was read, entitled, "A Description of Viscount Cole's specimen of *Plesiosaurus macrocephalus* (Conybeare)," by

* Jardine's Naturalist's Library: Lizars, Edinburgh; Highley, London.

Richard Owen, Esq., F.G.S., Hunterian Professor in the College of Surgeons, London.

The author premises his description of the *Plesiosaurus macrocephalus*, by pointing out the characters of a species of *Plesiosaurus*, which he regards as distinct from the *Plesiosaurus dolichodeirus* of Mr. Conybeare; and which, from the completeness of its skeleton in the British Museum and other collections, he selects for a more immediate comparison with the *Plesiosaurus macrocephalus*.

He proposes to call the species thus selected, as a term of comparison, *Plesiosaurus Hawkinsii*, in honour of the gentleman to whose remarkable skill and indefatigable labour, the beautiful and perfect skeletons of it are exclusively due. The chief points in which the *Plesiosaurus Hawkinsii* differs from the *Pl. dolichodeirus* are,—that the neck is a little longer than the trunk, instead of being fully equal to the body and tail united;—that it contains twenty-nine cervical vertebræ, bearing hatched-shaped ribs, instead of thirty-five; and that the length of the head is equal to one-tenth part of the total length of the skeleton, instead of one-thirteenth part as in the *dolichodeirus*. The *Pl. Hawkinsii* differs also in the relative shortness and form of the ulna and fibula, and in some other minor points.

Having defined the species selected to illustrate the specific peculiarities of the *Pl. macrocephalus*, Mr. Owen next offers some new views respecting the elementary composition of a vertebra in the abstract, suggested principally by a study of the vertebral column in the *Plesiosauri*; for having observed that the vertebral ribs, or the elements termed by Geoffroy St. Hilaire *paraaux*, or *para-vertebral elements*, are not bent down in the caudal region to form the protecting laminæ of the vascular trunks beneath the tail, but are continued as shorter rib-like processes through a great part of the tail, co-existing with the inferior laminæ (also called *paraaux* by Geoffroy), he proposes to call these latter or inferior elements (which remain united in the *Plesiosauri*) '*hæmapophyses*', in allusion to their physiological relations with the great blood vessels. The superior laminæ he denominates on the same principle '*neurapophyses*', from their being developed to protect the great nervous trunk. The author further observes that the parts or processes of a complicated vertebra are of two distinct kinds; some being developed independently in separate cartilages, while others are mere projections from these independent constituents.

As examples of the first, or autogenous elements, Mr. Owen instances the *centrum*, or body of the vertebræ; the *neurapophyses* and *superior spine*; the *hæmapophyses* and *inferior spine*; and the *ribs*, or

costal processes. The transverse and oblique processes are instances of the second, or exogenous parts of a vertebra.

The vertebræ of the *Plesiosaurus* are then described according to the preceding views, and the varying relations of the different vertebral elements in different regions of the spine are pointed out.

The dorsal vertebræ having been determined in previous descriptions of the skeletons of this genus by their usual anatomical character of affording articular surfaces to ribs, much difficulty has been experienced in defining the precise number of the cervical vertebræ, in consequence of the gradual change of the cervical ribs (hitherto considered as transverse processes), from the form of an expanded hatchet to that of an elongated style. The author, however, regarding the lateral appendages of the spinal column throughout its whole extent as modifications of one and the same vertebral element, proposes to distinguish the cervical and dorsal regions of the spine by the position of the articular surface supporting that lateral element, or rib: thus he would call cervical, all those anterior vertebræ in which the body affords the whole or any part of the costal articular surface; and the dorsal series would commence at that vertebra where the costal surface had first passed upon the neurapophysis. The author finds in the *Plesiosaurus Hawkinsii* that the costal processes of the two vertebræ which are articulated to the ilium, and which are consequently to be regarded as sacral, begin again to slide down from the neurapophysis upon the centrum; and that in the *Pl. macrocephalus*, where the costal appendages are lost, the bodies of the first two vertebræ which again begin to exhibit a portion of the costal pit, correspond, in their relative situation to the ilia, with the sacral vertebræ in the more perfect skeletons of the *Pl. Hawkinsii*. In the vertebræ which succeed the sacral ones, the ribs rapidly descend from the neurapophyses upon the centrum; but the bodies of the caudal vertebræ so characterized may be distinguished from those of the cervical by the absence of a longitudinal groove which traverses the costal pits in the cervical region; and also by the presence of the articular surfaces for the hæmapophyses. The determination of characters in the body or central element of a vertebra which point out the region of the spine to which it belongs, is the more valuable in the skeletons of the *Enaliosauri*, because in these cold-blooded reptiles ossification is tardy in its progress, and anchylosis of the autogenous elements of a vertebra rarely takes place; and hence the bodies are often found separated and detached from their peripheral appendages.

After concluding his observations on the structure of the vertebræ in the *Plesiosauri* generally, the author next proceeds to point out

the specific peculiarities of the cervical, dorsal, sacral, and caudal vertebræ of the *Plesiosaurus macrocephalus.*

The bodies of the cervical vertebræ of this species may be distinguished from those of the *Pl. Hawkinsii* and *Pl. dolichodeirus* by the close proximity of the costal to the neurapophyseal depressions: in this respect, indeed, the anterior cervical vertebræ of the *Pl. macrocephalus* differ from those of every *Plesiosaurus* which the author has examined. Other minor distinctive characters are also pointed out. The number of cervical vertebræ in the *Pl. macrocephalus* is twenty-nine, that of *Pl. Hawkinsii* thirty-one; the length of the neck is twice that of the head; in *Pl. Hawkinsii* it is three times the length of the head.

The dorsal vertebræ of the *Pl. macrocephalus* differ from those of the *Pl. Hawkinsii* and *Pl. dolichodeirus* in being more flattened in the antero-posterior direction, and more concave at the sides; true transverse processes are developed from the neurapophyses to support the ribs, as in other *Plesiosauri.*

In the sacral vertebræ the medullary canal presents a slight enlargement as compared with that in the neck.

The terminal caudal vertebræ in the specimen described are wanting, but in those of a perfect skeleton of the *Pl. Hawkinsii* in the British Museum, the author discovered an interesting modification of the surfaces by which the bodies are joined to one another. They are hollowed out like the vertebræ of the *Ichthyosaurus,* so as to join by double concave surfaces; he conceives this to be, as in the Batrachian reptiles, the original structure of all the vertebræ, and that it is permanent in those which are most remotely situated from the centre and source of vital energy: but Mr. Owen observes, that this arrest of development is obviously designed, to give to the tail of the *Plesiosaurus* the same combination of elasticity with flexibility, which characterizes that of fishes.

After describing the vertebral and sternal ribs of the abdominal region, the author next compares the bones of the pectoral and pelvic extremities with those of other species of *Plesiosauri.* In the *macrocephalus* the ulna is relatively longer and broader, and presents a more complete reniform figure than in the *Hawkinsii* or *dolichodeirus.* These characters are still more marked in the fibula; the femur is longer than the humerus. There are eight ossicles in the carpus, and six ossicles in the tarsus; these latter are so arranged as to allow of greater freedom of inflection forwards, and to give a compound motion to the stroke of the hinder paddle.

The author concludes with a detailed account of the structure of the cranium, which he compares, at each step, with that of the two

principal modifications of the Saurian type, as exemplified in the Crocodilian and Lacertine species; and he points out many particulars in which the *Plesiosaurus* deviates from the Loricate, and corresponds with the Lacertine or Squamate group. Amongst these may be noticed, the predominance of the elongated form in the cranial bones, extending from point to point with wide interspaces, and giving to the osseous fabric of the head the appearance of a scaffolding; the posterior bifurcation, mesial crista, and foramen of the parietal bone; the form and relative position of the posterior frontals, and especially the absence of the ridge which, in the Crocodile, extends like a second zygoma longitudinally across the zygomatic cavity. Mr. Owen further dwelt upon the form and position of the zygomatic portion of the temporal bone, the bony interspace of the external nostrils, the structure of the lower jaw, and particularly on the existence of a wide space on each side of the posterior region of the skull, bounded above by the arch formed by the bifurcate processes of the parietal and the tympanic bones, and opening into the temporal fossæ, as evidences of the affinity of the *Plesiosaurus* to the Lacertine Sauria. The correspondence of the cranial organization of the *Plesiosaurus* to those of the Crocodile, was noticed in the strength of the maxillary apparatus, the general form and structure of the upper jaw, and in the nature and alveolar lodgement of the teeth. The peculiarities of structure referable to the special exigencies of the extinct form of Saurian under consideration, were also dwelt upon, and, lastly, those which characterized the species described, and which illustrate its more immediate affinities.

ROYAL SOCIETY OF EDINBURGH.

April 9th.—Dr. Abercrombie, V.P., in the Chair.

Sir Charles Bell read a paper "On the Comparison of the Nerves of the Spine with those of the Encephalon." (Part ii.)

As this paper bears more directly on physiology than zoology we shall be the more brief. This part is chiefly occupied with the *portio dura* of the 7th pair of nerves of the brain, which is peculiar in its function, origin, and distribution. Instead of investigating its functions by experiments, the author stated it could be more humanely done by attentive observation on the living, and still more on the dying; it is pre-eminently a muscle of respiration, and its influence was conspicuous on the countenance through the process of dissolution to the last sigh; also in the highest state of excitement, mental and bodily, and in the state of greatest repose. Though not a nerve of pure sensation or volition, but of respiration, and although the

system to which it belonged at first appeared confused, yet still there was method in the complexity. Through nearly the whole animal series, its agency might be traced from the most simple up to the most complicated; in those instances where respiration was performed only by the air playing upon the surface; by its being admitted into some simple sac, or into tubes, or by then leading to viscera. Even after this, it became associated with other functions, as of taste, smell, speech, &c. No wonder then that it was complex; both vital and voluntary actions being most closely associated with it. For example, the throat was a common passage for respiration and deglutition; and how admirable that there is so little interference! Directions were given for tracing the *portio dura* from the surface to its true origin, in a flat layer spreading out on the *pons Varolii* or *nodus cerebri*; its relation to the spinal cord was then shown, as that of other nerves, the 8th, 6th, and 4th; its cause and distribution was then stated, corresponding to its varied functions, on the lips and other parts connected with speech, on expression generally, the play of the features, not excluding the eye. That every fibre and aperture of the countenance is associated with respiration, is now too clear to be disputed; direct experiments, as well as many of the phænomena of health, and yet more of disease, most strikingly demonstrate it. It acts in laughter, not negatively, or as the result of defective influence, but positively; so in extreme pain, in passion, &c. In his next paper the author means to point out in what respects this nerve differs from others.

Dr. Macdonald made a verbal communication on the Osseous Structure of Fishes.

The author had scarcely time to do justice to himself or subject, and we have still less in our limited space. He stated he thought zoologists attended too little to anatomy, those especially who gave themselves to tracing analogies throughout the scale of animated nature. He avowed himself an advocate for the quaternary not the quinquennary grouping of the series. His attention was first directed to the structure of fishes, when comparing the fourth or last portion of the first great circle, viz. the vertebrata, with insects. The analogies here were striking, but great mistakes are generally committed regarding them. Starting from the views propounded by Carus, of three important portions being fundamental, and which, in ascending, are converted into the jaws, the limbs, wings, &c. he traced these modifications through the series. Entomologists have almost universally erred in establishing analogies with the more complicated classes of animals. They state that the lower part of the anterior

portion of the body corresponds with the sternum of the vertebrata; whereas in insects there is a complete inversion. This lower part to which the limbs are attached does not correspond with the sternum but with the back. Then the internal viscera should be viewed in this same relation; they lie upon or are *above* the back, and are truly *epi*gastric not *hypo*gastric. When furnished with wings, if with two pair, the anterior proceed from the true thoracic arch, the posterior from the pelvic. In the turtle the three arches are beautifully seen; the *pro-thoracic* in the jaw, then the *thoracic*, and finally the *meta-thoracic* or pelvic. In this group, as in some of the neighbouring ones, from the peculiar arrangement of the pelvic and other bones, the heel is turned forwards and the toes backwards. In fishes M. Geoffroy St. Hilaire attempted to establish an analogy between the bones of the operculum and the ossicula of the ear. But this is quite wrong: these bones are nothing more than a peculiar arrangement of the thoracic arch and fore-arm, as may be seen in the osseous arrangement, in its connexion with the respiratory function in the gills. The *Proteus* when viewed in its compound character presents no exception. Again, not a less common, though equally glaring mistake is made with regard to the pectoral fin and the deeper seated parts connected with it. Proceeding upon analogical considerations, the bones have been designated the scapular, proscapular, humerus, &c., whereas the true analogy of these parts is not with the shoulder but with the pelvic limb. As the osseous system, correctly contemplated, demonstrates this, so do the soft parts, and more especially the nerves, whether we look at the nerves of sensation or motion, or the *portio dura* of the 7th. The prothoracic arch, as already stated, is found in the jaw, and here the analogy is as conspicuous as elsewhere. On looking at the skeleton of the *Lophius* there appeared to be a contradiction, for here we find something so like a fin or hand, that it cannot fail to be taken for it; but in seeking for it in the recent specimen it is not to be found; in truth it is so rudimentary, that it never reaches, far less protrudes from, the skin. These are merely a few hints upon a very extensive and interesting subject, which the author would do well to illustrate in a more systematic and satisfactory manner than was possible in a short verbal communication.

ROYAL IRISH ACADEMY.

May 28, 1838.—Sir W. Hamilton, A.M., President, in the Chair.

Mr. Ball read a paper, by Wm. Thompson, V.P., Nat. Hist. Society of Belfast, "On the Irish Hare." (*Lepus Hibernicus.*)

This paper commenced with a review of what has been written on the subject of the Irish hare, from the time it was brought under the notice of English zoologists in 1833, until the present period. Mr. Thompson stated, contrary to what has been advanced, that the hare of England and Scotland, and that of Ireland, have long been known to differ; and that in 1807 the difference in the fur of the two species was alluded to as a matter of common notoriety, in the MS. of the late John Templeton, Esq. He further stated, that on account of their differing from the Irish species, a number of hares were, upwards of thirty years ago, brought from England and turned out on the largest of the Copeland Islands, off the county of Down; and that many years since, the Irish hare was, for a similar reason, introduced to the island of Islay, off the coast of Scotland.

The *Lepus Hibernicus* is considered distinct from all described species. It exhibits, in several respects, characters intermediate between the British hares, *L. timidus* and *L. variabilis*; but considered generally, more nearly approximates to the former animal.

The chief result of detailed measurements is shown in the superior length of the ears and tail of *L. timidus*, compared with those of *L. Hibernicus*. The former, or common hare, displays greater diversity of colour on the head, ears, and body, than the Irish species, which again exhibits greater variety in that of the legs. The most obvious difference in colour (and which has been unnoticed by authors,) is in the tail, the upper surface of which is black in the *L. timidus*, and white, tinged with greyish towards the base, in the Irish species. On looking to their osteology, some slight differences are observable in the head; the comparatively more horizontal direction of the lumbar vertebra in the Irish hare is conspicuous, and likewise the relative shortness of its tail, which, as first recorded by Mr. Eyton, contains three vertebræ less than that of the English species, thirteen only being possessed by the former, and sixteen by the latter animal.

The occasional whiteness of fur in the Irish hare is believed by the author to be a consequence of age, and not regulated by the law that is understood to affect the Alpine hare, which is considered to change its dark summer fur to white at the commencement of every winter.

The œconomy and habits of the Irish hare, which generally correspond with those of the common species, are, together with a comparative description of form, colour, &c., very fully detailed in this paper.

ZOOLOGICAL SOCIETY.

October 24th, 1837.—Richard Owen, Esq., in the Chair.

The Prince of Musignano read a short communication upon the Long-tailed Trogon (*Trog. resplendens* of Gould).

The Quesalt, the native name of this species, is a rare bird, and very shy in its habits; it is confined to restricted limits, being solely found in a peculiar section of the mountainous district of Vera Paz, in the province of the same name, now forming one of the five independent states constituting the Federal republic of Central America. A single instance is on record of its having been domesticated. It builds its nest in the shape of a barrel or bag, open at both ends, by which means injury to its long tail-feathers is avoided. The Prince stated that he had communicated the present notice of the history of the Long-tailed Trogon to an American Journal some years since, and that so long as the year 1826, he had proposed that the specific name of *Paradiseus* should be given to the species.

Mr. Gray exhibited a drawing of a new species of the genus *Tetrapturus*, in the British Museum, which had been obtained at the Cape, and for which he proposed the specific name of *Herschelii**.

Mr. Gray afterwards called the attention of the Meeting to some pieces of chalk, which he had recently found in the cliffs at Brighton, exhibiting perforations made by the *Patella* and *Pholas*, and presenting appearances which he considered to have been produced in the case of the latter genus by the rotatory action of the valves.

The remarks of Mr. Gray elicited considerable discussion as to the manner in which certain molluscous genera penetrate limestone rocks and other hard substances, a phænomenon which Mr. Owen thought could not be explained upon the supposition of its being exclusively caused by a rotation of the valves, but that it was chiefly due to the mechanical influence of the currents of water produced by the vibratile *cilia* of the animal, as noticed by Mr. Garner in a communication made to the Society in 1835.

Mr. Martin exhibited a new Bat from Fernando Po, belonging to the genus *Rhinolophus*, which he characterised as

RHINOLOPHUS LANDERI. *Rhin. vellere molli, et pulchrè castaneo-rufescente; auribus acutis, patulis, erectis, ad latus exterius emarginatis, et lobo rotundato accessorio instructis; prosthemate duplice; anteriore bidentato cum scypho parvulo ad basin anticam, hóc ferro-equino membranaceo circumdato; prosthemate posteriore*

* The description of this species with a plate will be found in vol. i. p. 313 of this Journal.

ad basin transversùm sinuato, ad apicem acuto ; ferro-equino membranaceo, lato, margine libero anticè bifido ; pollice brevi, gracili, in membranâ subtùs per dimidium incluso : ungue parvulo ; anti-brachiis robustis ; cruribus gracilibus ; patagiis nigricantibus.

	unc.	lin.
Longitudo corporis cum capite	1	$4\frac{1}{2}$
——— *caudæ*		9
——— *aurium*		$7\frac{1}{2}$
——— *antibrachii*	1	$7\frac{1}{2}$
——— *cruris*		8
——— *calcanei*		$4\frac{1}{2}$
Prosthematis longitudo		2
Alarum amplitudo	9	

Habitat in Insulâ Fernando Po.

"This beautiful little species of Bat is a genuine *Rhinolophus* ; the nasal appendages consist of a horse-shoe, a crest, and an elevated leaf. The horse-shoe is broad with indications of a double furrow; its outer margin is free and bifid anteriorly. In its centre is placed a little cup-like depression with an elevated rim, from the back of which rises a bifid crest not much elevated : the larger apex is the posterior of the two. On each side of this crest and behind it, the skin continued from the horse-shoe, and forming the base of the leaf, is furrowed by two deep but unequal *sulci*, with a marked posterior ridge, elevated across the base of the leaf, which latter ends in a short acute lanceolate point; posteriorly it is covered with short hairs, anteriorly it is nearly naked. Its length is two lines. The ears are large, broad, and pointed; the outer margin is emarginate, and passes into a large rounded accessory lobe, closing the ear anteriorly. The *anti-brachia* are short, the thumbs small, the *tibia* slender.

"The fur is soft and delicate, and of a fine light or rufous chestnut, a little darker on the middle of the back; the wings are blackish.

"I have ventured to name this species in honour of the late enterprising, but unfortunate Mr. Lander, during whose expedition it was taken at Fernando Po."

Mr. Martin also communicated to the Meeting the following notice of a new species of Hedgehog.

"Among the specimens of Natural History, from the neighbourhood of Trebizond, presented to the Society by Keith Abbot, Esq., is a species of Hedgehog, decidedly differing from our well-known British species, and appearing to be at present undescribed. It is much smaller than the *Erinaceus Europæus*, measuring from the tip of the muzzle to the root of the tail, over the arch of the back, only $9\frac{1}{2}$ inches. The spines advance upon the forehead, and overshadow the eyes;

the general colour presented by the spines 'en masse' is mahogany brown, but each spine individually taken is yellowish brown for three parts of its length from the basal extremity; this colour then becomes darker, and again passes into yellowish brown at the extreme apex; the annulation, however, is far less decided than in the British animal.

"The ears are short and rounded, a white patch is placed before them, and also on the forehead; the chest is dirty white; the sides of the muzzle, and the whole of the under surface are intensely blackish, or umbre brown, several long white hairs being intermixed with the rest on the shoulders, extending from the chest.

"The *tarsi* are longer than in *E. Europæus*. In a very large specimen of the latter, measuring from the nose to the root of the tail, over the back, 14½ inches; the foot from the heel to the end of the middle toe, excluding the nail, measures 1 inch ⅛, while in this smaller species it measures 1 inch ⅝.

"For this species I propose the name of *Erinaceus concolor*. It may be thus characterised.

"Erinaceus concolor. *Er. obscurè fuscus, spinis in frontem, et super oculos obductis; spinis rigidis, flavescenti-fuscis ad basin, apicem versus intensè fuscis, apice extremo pallidè rufescenti-brunneo; auribus parvis, rotundatis; rostro breviusculo; in frontem notâ albâ, necnon ante aures; pectore sordidè albo, vellere corporis subtùs nigrescenti-fusco, pilis longis albis ad humeros sparsìm intermixtis.*

	unc.	lin.
"Longitudo corporis, a rostro ad caudæ basin, super dorsum	9	6
Longitudo pedis postici a calce ad apicem digiti intermedii ungue excluso	1	7½

"Habitat apud Trebizond."

Mr. Waterhouse called the attention of the members to two species of Kangaroos, which were upon the table. One of these had lately been procured by the Society, and was from the neighbourhood of Hunter's River, the other had died in the Menagerie. Of this latter species the Society has possessed several living specimens; and there is still one in the Gardens, which was bred there.

Mr. Waterhouse stated that his object in bringing the animals in question before the Meeting, was to show that the specimen from the Menagerie was not, as had been supposed, the *Macropus ualabatus* of Lesson, but that it was in fact an undescribed species, being distinguished from that of Lesson, (which Mr. Waterhouse considered as identical with the specimen from Hunter's River,) by the following

characters :—the under parts are grayish white, instead of buff yellow ; the ears are rather longer in proportion, and the tail hoary gray, white beneath, and with a white tip, instead of being almost totally black. Mr. Waterhouse proposed that the name *Macropus Bennetti* be adopted for this species, and proceeded to characterise it as follows :

Macropus Bennetti. *Mac. intensè cineraceus, regione scapulari, clunibus, et regione circum-oculari, rufo-brunneis ; corpore subtùs cinerescenti-albo ; rostro, auribus posticè, digitis anticis posticisque nigris ; lineâ albescenti vix distinctâ ab angulo oris, ad genas excurrente ; caudâ cinerescente, ad apicem nigrâ, et subtùs sordidè flavescenti-albâ.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin	24	10
——— *caudæ*	24	7
——— ab apice rostri ad marginem oculi ..	3	0
——— ab apice rostri ad basin auris	5	10
——— *tarsi digitorumque* (sine unguibus) ..	8	9
——— *auris*	3	1

Hab. Novâ Cambriâ Australi.

" The fur of this animal is rather long and moderately soft ; the longest hairs on the middle of the back measure about two inches, and the shorter about one and a half inches in length. Its general line is a very deep gray, inclining to black on the back, somewhat paler on the sides of the body, and a rust-like tint is observable on the back of the neck and base of ears externally, over the haunches and shoulders and in the region of the eye. The under parts of the body, and the inner side and fore part of the hinder legs, are of a grayish white colour. The muzzle is black, and the crown of the head is brown black ; an obscure whitish line extends backwards from the corners of the mouth, and becomes obliterated on the cheeks ; the hairs on the lips are dirty white ; the chin is blackish. The ears are furnished with white hairs internally, and longish black hairs externally, excepting at the base. The limbs externally are of the same hue as the sides of the body ; the fore feet, and the toes of the hind feet are black, the outer side of the heel is also black. The hairs of the tail (excepting at the base, where they are of the same colours and character as those of the body) are rather harsh, black, and broadly annulated with silvery white near the apex ; the general tint is hoary gray, the white portion of each hair being most conspicuous ; the apex of the tail is black, and on this part the hairs are long and form a kind of tuft ; the under side of the tail is white. The hairs on the upper part of the body are of a deep slate colour at the base, the remaining portion of each hair is black annulated with white, or more generally with pale rust colour ; on the under parts

of the body, the hairs are of a deep slate colour with the apical portion white.

"The above descriptions and dimensions are taken from an adult male; the two females in the Society's Museum are of a smaller size and paler colour, their prevailing tint being reddish gray: around the entrance to the pouch the hairs are of a deep rusty brown colour."

A species of Mouse from the Cape of Good Hope was next described by Mr. Waterhouse under the name of

Mus subspinosus. *M. pilis subspinosis, corpore suprà fuscescenti-griseo; ad latera flavescente; subtùs niveo, oculis flavido cinctis; caudâ capite corporeque breviore; auribus mediocribus.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin	3	4
——— *caudæ*	2	11
——— ab apice rostri ad basin auris	0	$10\frac{1}{2}$
——— *tarsi digitorumque*.....	0	$8\frac{1}{4}$
——— *auris*	0	$3\frac{1}{4}$

Hab. Cape of Good Hope.

"This species is allied to the *Mus Cahirinus* of Geoffroy; it is, however, not so large; and although the hairs are flat and bristle-like, they are less harsh than those of the North African species; it also differs in its colouring."

Mr. Gould introduced to the notice of the Meeting a very singular form among the *Caprimulgidæ* for which he proposed the generic appellation of

Amblypterus.

Rostrum debile et elongatum.

Nares elevatæ et rotundatæ.

Rictus setis robustis instructus, rostro longioribus.

Alæ truncatæ; remigibus externis sextis ferè æqualibus et falcatis; remigibus 2do, 3^{tio}, 4to ad externum pogonium emarginatis, 7mo, 8vo, 9no ad apices elongatis et attenuatis, 10mo abrupte brevi; secondariis brevissimis, rotundatis et ab tertiariis tectis, his longissimis.

Cauda brevissima et quadrata.

Pedes ambulatorii.

Tarsi elongati, graciles, squamis indistinctis antice et postice fasciati; digito intermedio longissimo et gracillimo; digitis lateralibus brevibus et æqualibus; digito postico parvo, debili et libero; unguibus elongatis, ungue medio pectinato.

Amblypterus anomalus. *Amb. summo capite, corpore suprà et alis cinereo-fuscis, singulis plumis nigro irregularitèr sparsis et maculatis; primariis nigris, ad bases rubrescenti-cervinis, ad apices albis; secondariis cervinis, nigrescenti-fusco irregularitèr*

fasciatis; rectricibus caudæ cervinis, nigrescenti-fusco irregulariter fasciatis et maculatis; duabus centralibus cinereo-fuscis; gutture, pectore et abdomine ad partem superiorem nigrescenti-fuscis, singulis plumis cervino maculatis; abdomine imo pallide cervino, singulis plumis nigrescenti-fusco transversìm fasciatis; rostro fusco; pedibus pallide fuscis.

Long. tot. unc. $6\frac{3}{4}$; *rostri*, 1; *alæ*, $5\frac{3}{4}$; *caudæ*, 3; *tarsi*, $\frac{7}{8}$.

Obs. Mr. J. E. Gray believes this bird to be from Demerara, or the Brazils; the specimen is in the collection at the British Museum, and so far as I am aware is unique.

Mr. Gould afterwards exhibited a species of *Ibis*, having many characters in common with the *Ibis religiosa* of Cuvier, and two new species of the genus *Platalea*, which were accompanied with the following descriptions.

Ibis strictipennis.—*Ib. capite et collo superiore nudis, et nigrescenti-fuscis, cœruleo lavatis; corpore toto, et alis albis, cervino lavatis; plumis in gulâ longis, angustis, lanceolatis et rigidis; primariis ad apices cœruleo-viridibus; tertiariis valdè productis et nigro-cœruleis, albo sparsis; tarsis et spatio nudo sub alâ rufo-fuscis.*

Long. tot. unc. 30; *rostri*, 6; *alæ*, $14\frac{1}{2}$; *caudæ*, 6; *tarsi*, 4.

Hab. Australiâ.

Platalea regia. *Plat. cristâ occipitali pendente et corpore toto, pectore excepto, albo; pectore flavo parum lavato; fronte facie anteriori et gulâ plumis prorsus nudis; notâ super oculos atque in occipite medio aurantiacâ.*

Long. tot. unc. 39; *rostri*, $8\frac{1}{2}$; *alæ*, 15; *caudæ*, $5\frac{1}{2}$; *tarsi*, $5\frac{1}{2}$.

Hab. Novâ Cambriâ Australi.

Fœm. *differt a mare adulto, staturâ minore.*

Platalea flavipes. *Plat. corpore toto albo; parte faciei nudâ angustiore quàm in* Plat. regiâ; *parte nudâ et rostro aurantiacis; pedibus flavis.*

Long. tot. unc. 28; *rostri*, $7\frac{1}{4}$; *alæ*, $14\frac{1}{2}$; *caudæ*, $5\frac{1}{2}$; *tarsi*, $4\frac{3}{4}$.

Hab. Novâ Cambriâ Australi.

MISCELLANEOUS.

HELMINTHOLOGY.

D. C. M. Dresing, in the Nova Acta Phys. Med. xii., has given two papers on Helminthology; one a monograph of the genus *Tristoma*, describing four species, one of them hitherto unknown; and the other on some new genera and species of this animal, amongst which is a fifth *Tristoma*.—J. E. Gray.

NEST AND EGGS OF THE WATER RAIL (*Rallus aquaticus*).

The bird had selected for her nest a thick turf of long grass, hollow at the bottom, on the side of the reed pond; the nest, about an inch and half thick, was composed of withered leaves and rushes; it was so covered by the top of the grass, that neither bird, nest, or eggs could be seen; the entrance to and from the nest was through an aperture of the grass, directly into the reeds, opposite where any one could stand to see the nest. The length of the eggs on an average were one inch and a half, some near a tenth more, others near a tenth less; weight, seven drachms; colour, light cream, thickly spotted at the larger ends with bright rusty red, intermixed with sunk faint lilac spots, thinly and finely spotted at the lesser ends with the same colours, with a blush of pink over the whole egg, but more towards the lesser ends; the yolk a bright blood red, brighter than any egg I ever opened, and I think that the pink tint of the shell is owing to the redness of the yolk, for after emptying the eggs it was hardly perceptible. On the 20th of June I found another nest in the same reed pond; the eggs were destroyed; this nest was built among the reeds, and very near the water. On the 10th of July I obtained a third nest, from the same place, of eleven eggs within two or three days of hatching, the nest and situation much like the first.—JOHN SMITH, Yarmouth.

WALKING OF THE SEAL.

The common seal in the Zoological Gardens, when on the land, scarcely uses its feet in walking, but only the abdominal muscles, jerking itself forward by a series of convulsive actions. It only used its fore-feet to assist in balancing itself, and when it turned on one side it expanded its hinder feet, which are generally contracted and held together, with the depressed forked tail between their base. This does not arise from any imperfection in the formation of the fore-feet, for it used them as hands to bring bodies near to its mouth. —J. E. GRAY.

HYDRÆ.

A. J. Corda, in the Nov. Act. Ph. Med. xviii. 299. t. 14—16, has given a very complete anatomy of the brown fresh-water polypus (*Hydra fusca*), showing that the animal is of a much more complex organization than was previously supposed, and that the digestive cavity is furnished with a short straight canal, ending with a distinct vent in the hinder part of the body near the foot or part by which it adheres.—J. E. GRAY.

Register of Meteorological Observations for June 1838, *made at Applegarth Manse, Dumfries-shire. By the Rev. Wm. Dunbar.*

(Omitted last Month.)

Days of Month.	Barometer.		Therm.		Wind.	Rain.	Weather.
	9 a.m.	9 p.m.	9 a.m.	9 p.m.			
June 1	29·80	29·75	50	49	E.	...	Cold and withering.
2	29·63	29·58	49½	49	SW.	...	Fine: rain: genial.
3	29·54	29·50	55	52	SSW.	...	Showery and sunny.
4	29·49	29·60	59	53	S.	...	Showery and warm.
5	29·71	29·85	62	52½	S.W.	...	Showery: thunder.
6	29·96	30·02	61½	47	E. by N.	...	Showery: cold P.M.
7	30·05	30·08	56	45½	SSW.	...	Dry: cool: genial.
○ 8	30·13	30·11	55	48½	N. & S.	1·12	Dry: cool: genial.
9	29·97	29·71	54	50	SSW.	...	Dry, but threatening rain.
10	29·48	29·40	50	51	S.	0·46	Wet all day.
11	29·49	29·50	56	49	SE.	0·72	Wet: thunder.
12	29·61	29·67	55	49½	NE.	...	Dry and pleasant.
13	29·68	29·64	53	51	NE.	...	Dry: rather cool.
14	29·51	29·50	51	48	NE.	0·62	Wet throughout.
☾ 15	29·50	29·49	53	53	SW.	1·80	Very genial day.
16	29·53	29·55	55	55½	S.	1·46	Soft rain all day.
17	29·64	29·67	57	56	S. by W.	...	Fine growing weather.
18	29·55	29·36	60	57	N.E.	...	Fair A.M.: wet P.M.: thund.
19	29·30	29·50	55½	55	W.	0·96	Wet preced^g night: dry P.M.
20	29·49	29·20	59	50	SW.	1·32	Very wet afternoon.
21	29·21	29·25	57	51	SW.	3·74	Fair all day.
● 22	29·37	29·60	52	52½	SW.	...	Showery A.M.: cleared.
23	29·89	29·91	60	54½	SSW.	...	Fair: fine day.
24	29·80	29·80	62	56	SSW.	...	Fair all day.
25	29·91	29·93	56	58	SSW.	...	Fair and mild.
26	29·86	29·86	66	...	SE.	...	Fair and warm.
27	29·75	29·80	56	50	SE.	...	Wet A.M.: cleared up.
28	29·80	29·85	61	48½	S.	...	Fine summer day.
29	29·87	29·85	54	54	NE.	...	Showery, but warm.
☽ 30	29·70	29·74	54½	56	NE.	0·60	Cloudy and moist.
Mean.	29·71	29·67	56	51¾		7·26	

METEOROLOGICAL OBSERVATIONS FOR JULY 1838.

Chiswick.—July 1. Cloudy and fine: rain. 2. Sultry: rain. 3. Rain. 4. Hazy: fine. 5. Very fine. 6. Heavy rain with thunder: fine. 7, 8. Fine. 9—11. Very fine. 12. Overcast. 13. Very hot: lightning at night. 14. Rain. 15. Showery. 16—22. Very fine. 23. Overcast. 24, 25. Fine. 26. Cloudy and fine: rain. 27. Fine. 28. Very fine: slight rain. 29. Cloudy: rain. 30. Heavy showers. 31. Very fine.

Boston.—July 1. Cloudy: rain early A.M. 2. Cloudy: rain P.M. 3, 4. Cloudy. 5. Fine. 6. Fine: rain P.M. 7. Fine. 8. Rain. 9. Cloudy. 10. Fine. 11. Cloudy: rain early A.M.: rain P.M. 12. Cloudy. 13. Fine: thunder and lightning P.M. 14. Cloudy: rain early A.M.: rain P.M. 15. Fine: rain P.M. 16. Cloudy. 17. Fine. 18. Cloudy. 19. Fine. 20—22. Windy. 23. Fine: rain P.M. 24. Fine. 25. Cloudy. 26. Fine: rain P.M. 27. Stormy. 28. Fine. 29. Fine: rain A.M. 30. Fine: rain A.M. 31. Fine.

Applegarth Manse, Dumfries-shire.—July 1. Shower A.M.: fair P.M. 2. Fair all day. 3, 4. Fine summer days. 5. Excellent weather. 6. Warm: thunder: rain. 7. Showery all day. 8. Fair: mild: cool P.M. 9. Dull day: very cloudy. 10. Rain in the afternoon. 11. Rainy all day: fog P.M. 12. Rain: cleared up P.M. 13. Showery. 14. Showery all day. 15. Showery: cleared P.M. 16. Showery A.M.: cleared. 17. Wet all day. 18. Fine day: moist P.M. 19. Showery all day. 20. Fair day, though cool. 21. Fair A.M.: showery P.M. 22. Fair throughout. 23. Heavy rain: thunder. 24. Fair throughout. 25. Fair, but cool. 26. Wet nearly all day. 27. Showery A.M. 28. Showery nearly all day. 29, 30. Showery P.M. 31. Fair throughout.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. Roberton; *by* Mr. Thompson *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. Veall *at Boston, and by* Mr. Dunbar *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1838. July.	Barometer.						Thermometer.								Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick. 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	9 p.m.	Fahr. 9 a.m.	Self-register. Max.	Self-register. Min.	Max.	Min.		9a.m.	9p.m.									
1.	29·928	29·980	29·913	29·40	29·79	29·90	62·2	67·0	55·5	76	56	60	54	54	S.E.	S.	NE.	SE.	·055	·34	·22	...	57
2.	30·048	30·031	29·992	29·53	29·96	29·96	61·8	65·7	57·3	78	56	59	56	58	E.	S.	calm	NE.	·500	·09	...	...	59
3.	30·070	30·065	30·025	29·50	29·96	29·98	63·6	71·4	59·7	70	51	62	62	62	NW.	SW.	calm	E.	·050	·14	·10	...	60
4.	30·140	30·142	30·121	29·52	29·98	29·98	65·5	68·0	58·2	80	48	69	74	64	S.	S.	calm	E.	·352	·06	...	...	59
5.	30·198	30·166	30·080	29·57	29·98	29·98	67·8	71·4	57·6	81	49	68	70	60	E.	SE.	calm	SW.	·050	...	...	...	60
6.	30·050	30·042	29·996	29·43	29·90	29·70	64·0	74·0	60·2	77	52	71	69	58½	S.E.	S.	S.	SW.	·244	·45	...	0·63	63
○ 7.	30·010	29·997	29·972	29·33	29·65	29·65	64·3	73·2	56·7	70	54	64	61	57	S.	SW.	W.	SW.	·055	·11	·12	0·65	59
8.	29·968	30·077	29·995	29·30	29·70	29·83	62·7	69·6	58·0	72	56	60	56	59½	SW. var.	W.	calm	WSW.	·088	...	·02	1·28	59
9.	30·182	30·164	30·149	29·50	29·83	29·86	66·2	70·6	59·2	78	56	64·5	58	57	S.	W.	W.	SW.	...	...	...	...	60
10.	30·204	30·188	30·130	29·46	29·79	29·77	65·2	74·6	59·2	80	60	64	56	57	SW.	SW.	W.	S.	...	...	...	0·55	61
11.	30·160	30·115	30·042	29·40	29·79	29·72	69·6	74·3	59·3	80	59	71	57½	56½	S.	SW.	W.	S.	...	...	·03	...	61
12.	30·100	30·077	29·994	29·35	29·72	29·80	67·4	78·2	61·4	82	60	68	59	59	S. var.	SW.	W.	S.	...	...	·06	0·18	63
13.	30·030	30·006	29·803	29·35	29·74	29·58	69·7	73·6	60·7	84	58	68	60	58	W.	SW.	calm	S.	...	...	...	...	62
☾ 14.	29·766	29·752	29·669	29·06	29·43	29·19	66·3	78·8	62·5	84	56	66·5	59	55	SW.	SW.	W.	S.	...	·18	·03	0·73	63
15.	29·762	29·905	29·722	29·50	29·27	29·50	65·7	68·0	59·0	73	51	66·5	56½	56	SW. var.	SW.	NW.	SSW.	·183	·17	·24	...	60
16.	30·096	30·202	30·024	29·40	29·65	29·90	65·2	76·7	55·3	75	45	65	58	56½	NW. var.	SW.	NW.	W.	·111	...	·10	...	61
17.	30·252	30·221	29·958	29·53	29·94	29·78	65·9	79·0	54·3	74	57	64	56	54	S.	SW.	NW.	E.	...	...	...	1·04	59
18.	30·116	30·283	30·100	29·49	30·00	30·06	63·8	73·5	60·0	73	51	61	58	55	NW.	SW.	N.	NW.	...	...	...	...	60
19.	30·266	30·265	30·057	29·63	29·90	29·80	66·8	72·8	57·2	78	50	66	54½	55½	S. var.	W.	NW.	SW.	...	·03	...	...	60
20.	30·012	30·007	29·983	29·33	29·75	29·80	62·0	74·3	55·8	75	49	65	58	53	W.	W.	NW.	NW.	·041	...	...	...	59
● 21.	30·050	30·132	30·031	29·48	29·97	30·06	59·4	71·3	53·2	67	51	58	58	52	NW.	N.	N.	NW.	·008	...	...	...	55
22.	30·200	30·188	30·160	29·64	30·10	30·05	56·0	68·4	52·3	64	42	57	56	52½	NW. var.	N.	N.	NW.	...	...	...	1·04	52
23.	30·184	30·182	29·986	29·66	29·99	29·87	58·4	61·8	50·4	70	52	57	58½	49	NW.	NW.	N.	NNW.	...	...	...	0·65	53
24.	29·988	30·002	29·970	29·44	29·88	29·88	56·4	63·3	53·8	67	40	56	54½	53	NW. var.	NE.	N.	NNW.	·022	...	·24	...	50
25.	30·008	30·008	29·998	29·48	29·88	29·83	59·8	62·8	49·6	70	41	56·5	57	52½	W.	NW.	calm	NW.	...	...	...	...	53
26.	29·982	29·992	29·708	29·38	29·70	29·55	60·7	65·5	49·7	70	51	59	56	53	NW.	W.	N.	SW.	...	·16	...	...	51
27.	29·820	29·830	29·804	29·15	29·57	29·55	60·0	66·7	52·7	71	48	59	57	53½	W.	W.	N.	W.	·102	...	·10	...	54
28.	29·822	29·816	29·711	29·21	29·52	29·43	61·8	70·4	53·3	72	50	61	56½	51	NW.	SW.	NW.	S.	·013	·05	...	...	54
☽ 29.	29·648	29·651	29·620	29·07	29·40	29·40	60·7	68·3	53·3	72	44	61	56	50	S.	W.	NW.	W.	·052	·09	...	...	56
30.	29·708	29·698	29·792	29·11	...	29·50	61·4	71·3	50·2	72	44	58	55	51½	SW. var.	W.	calm	SW.	·125	·32	·17	1·23	55
31.	29·884	30·008	29·861	29·29	29·60	29·77	61·7	70·5	50·0	74	47	60	54	53	S.	W.	calm	NW.	·208	...	·21	...	55
Mean.	30·022	30·038	29·947	29·40	29·44	29·44	63·3	70·8	56·0	74·48	50·77	62·7	58¾	55⅓					Sum. 2·259	2·19	1·64	4·93	Mean. 57·8

ANNALS OF NATURAL HISTORY.

X.—*Observations on the Fur Seal of Commerce.* By R. Hamilton, Esq., F.R.S.E., M.W.S., &c.

[With a Plate.]

In soliciting attention to the Fur Seal of Commerce, we need scarcely remark that it claims regard in a commercial as well as in a scientific point of view. With the existence of the seal trade of the northern regions we have for centuries been familiar; but this trade must yield both in extent and importance to that which more recently has been prosecuted in the southern hemisphere. The fur seal has not indeed formed the sole object of the southern trade, some of its congeners being of equal or even greater importance; more especially the *proboscis* seal of Peron, which, from its magnitude, not less than its nasal appendage, well merits its appellation of the *sea elephant*. This species attains the dimensions of 20, 25, and even 30 feet in length, with an unwonted proportional bulk, thus equalling in dimensions half the size of the great Greenland Whale; and the oil obtained from it is of very superior quality. Next however in importance to this giant of the group unquestionably comes the fur seal, which has yielded its thousands and tens of thousands sterling to the adventurous trader.

This is not the place to dwell upon the origin or to trace the history of the South Sea seal trade, but a few notices may not be unacceptable. Soon after Captain Cook's voyage in the Resolution in 1771, he presented an official report concerning New Georgia, in which he gave an account of the great number of proboscis seals and fur seals which he had encountered on the shores of that island. The information speedily tempted several enterprising merchants to fit out vessels for the capture of these animals. With regard to the oil obtained from the former, it has been stated, on most respectable authority, that during a period of about fifty years, not less than 20,000

tons were annually procured from this spot alone for the London market, which at a very moderate price, say 50*l.* per ton, would yield about 1,000,000*l.* per annum. With regard again to the fur seal, from the same island, the English and others, chiefly the Americans, have procured a number of skins which cannot be estimated at less than 1,200,000. From the island of Desolation also, which Capt. Cook first made known, the number has scarcely been smaller nor the profit less; and finally, with regard to South Shetland, the number taken off by vessels of different nations, during the two years 1821 and 1822 alone, was not less than 320,000. The value of these skins of course varies with the state of the market; but it is in relation to them, it has been stated in the current edition of the Encyclopædia Britannica, that "from about the year 1806 till 1823 an extensive trade was carried on in the South Seas in procuring seal skins, which in that part of the world are covered with a fine fur. They were obtained," it is added, "in vast abundance by the first traders, and yielded a very large profit. Cargoes of these skins yielded five and six dollars a piece in China, and the present price in the English market averages from thirty to fifty shillings*."

With regard to the fur seal trade alone several thousand tons of shipping have annually been employed†; and respecting the seal trade generally, it has recently been stated that the English and Americans, who together nearly engross the whole, employ not fewer than sixty vessels of from 250 to 300 tons burden‡.

It must be regarded as not a little singular, and yet we believe it is not more singular than true, that this animal, which has been the object of such extensive and profitable pursuit, has not hitherto been described by the scientific naturalist; so that were any one to turn to works of science, he would not only be unable to ascertain the characters of the fur seal, but would even be at a loss to discover whether in the long catalogue of the *Phocæ* which has been accumulated, the fur seal has obtained a place. At several distant æras of the science, indeed, a few indistinct notices of this species of seal may

* Vol. x. p. 264. † Voy. towards the South Pole. Lond. 1825, p. 54.
‡ Lesson, Dict. Class. des Sc. Nat.

perhaps be found, under the names of *longicollis* and *Falklandica*; and these it may be interesting to consider in the sequel. But with these exceptions, which are truly more apparent than real, it will be found that so far as the records of the science are concerned, this animal has hitherto been neither recognised nor described.

It is the object of the following pages to supply these deficiencies; not indeed with all the accuracy we could wish, but so far as our opportunities permit. We shall first, however, premise a word or two respecting the *furs* of seals.

A slight examination of the recent skins speedily exhibits that two substances sufficiently distinct go to form the coat or robe of most seals, as well as of many other animals. These are *hair*, so well known on our own persons, and on most quadrupeds, and a soft *woolly down or fur*, which usually lies at the root of the hair, close to the skin, and which is penetrated and covered by the hair. The hair of the different species of seals is in very various quantities and of very different qualities; as is also the fur, positively and relatively. Sometimes the hair is exceedingly coarse and meagre, and accompanied with little or no down, so as to be of no more value to the furrier than the hide of the horse or ox. In other instances the hair is copious, soft, long, and silky, so that even without down, and still more with it, it is highly esteemed as a fur skin, and is used like those of the fox or sable; and once more, there are certain species in which the relative quantity and quality of the hair is so inferior to that of the fur, that the former is disregarded, and is wholly removed, so that nothing is left but the soft woolly down. Of this last description is the *fur seal skin* of commerce. We need scarcely add, that the skins of a great variety of seals are very extensively used both by rude and refined nations. They are employed by the former especially, as leather is with us, as articles of dress and for domestic purposes, both raw and tanned, and sometimes made water-proof. They are also used in their natural state, the fur being retained; and in this condition some of them are compared to velvet: they are in this way extensively employed by savage tribes, and also throughout Russia and Asia, and more sparingly among ourselves. But

thirdly, the proper seal fur of commerce is formed of skins from which the hair is removed by art, leaving the under exquisitely soft and downy covering, which forms an article highly prized by all nations.

In the absence of scientific information respecting the animal yielding this fur, we must turn to our navigators and seal hunters; and we find that one of the earliest intimations is that already alluded to in Capt. Cook's memorial, which in all probability had reference to this seal. Another early notice concerning this animal is from the pen of Lieut. Clayton, who in the year 1773-4 commanded the English settlement in Saunders Island, one of the Falklands, which he characterizes as a barren, dreary, desolate, boggy, rocky spot. In his paper in the Phil. Trans. 1775, he tells us that four kinds of seals were found there, viz. the common seal, the sea lion, the clapmutch, and the fur seal, which last, he says, has its name from its coat, which is a fine soft fur; and it is also thinner-skinned than any of the others: he adds, that from these isles a valuable fishery might be carried on*. But still more to the point, we have the information derived from the late gallant and enterprising Weddell, who, as is well known, with his little squadron consisting of the Jane of Leith of 160 tons, and the Beaufoy of 65, penetrated in the year 1823 two hundred and fourteen miles nearer the South Pole than the celebrated Cook or any other navigator had previously done. We never heard of this distinguished individual when alive, but happy should we feel could we by any means be the humble instruments of procuring for his services in our own department the meed of praise they really merit. He was a most successful and extensive seal hunter, and engaged in successive voyages with this single object in view; and, judging from his published work†, he was an accomplished and intelligent as well as a successful mariner. He invariably and without hesitation speaks of the fur seal as one and as distinct from all others of the southern hemisphere, which he contradistinguishes as *hair* seals. He encountered the fur seal in South Georgia, among the South Orkneys, and in much greater

* Phil. Trans., vol. lxvi. p. 102.

† Voyage towards the South Pole. London, 1825.

numbers in the South Shetland islands, which he was the first to discover. He expressly states, "that the species of seal which inhabits the shores of these last-named islands is exclusively the fur seal;" and again he says, "I have mentioned that the only species of seal found in these islands is that possessing the fur:" and he adds, "the circumstance of its possessing a valuable fur has not been noticed in any description of the seal which I have met*." Our researches have probably been somewhat more extended than those of Mr. Weddell, and it will be seen that our remarks are very much in accordance with his observation.

Among several other good offices which this gentleman performed for this department of science, one was his conveying to this country, and depositing in the hands of the eminent keeper of the Museum of the University of Edinburgh, two specimens of the stuffed skins of this animal; and assuredly, judging from what he has done in other cases, he would have done more, had he not imagined that naturalists on this point required no help from him. These two specimens are now in the Museum, preserved in excellent order, and though insufficient satisfactorily to establish all the characters of the animal, yet as supplying the majority of them, we shall present a faithful sketch and a detailed description. The specimens are very nearly alike in every respect; they appear to have been carefully and accurately prepared, and to have been obtained from female animals†. Judging from the specimens, this seal upon the whole is long and slender‡, having much the shape of a double cone, largest at the middle and tapering at both extremities. The head is broad and rather flat; the external ear is black, narrow, and pointed. The fore paws are precisely in the middle of the animal; their shape is pyramidal, and in addition to the fore paw, properly so called, there is a strong projecting membrane running from the tip along the posterior margin to the base; they have no vestige of nails.

* Loc. cit. p. 137, 141-2.

† For the accompanying very beautiful drawing I am indebted to the kindness and skill of Mr. Stewart, so well known for his faithful and elegant sketches of animated nature, and we have no doubt that an acquaintance with this drawing alone would enable any one at once to recognise the animal.

‡ I would here observe that in noting the characters I have had the valuable assistance of my friend Mr. William Jameson.

The hind flippers are rhomboidal in their shape, and consist of the fleshy portion, and a membranous addition, which at its termination is divided into five strap-like processes; there are nails on all the toes but the great one, those of the three middle toes being much the largest and quite straight; there is a curious *slashing* at the junction of the common skin and the membrane,—the skin covered with hair descending to the nail, whilst the membrane runs up between the toes more than an inch. The coat or robe is composed of *hair* and *fur*; the former is very soft, smooth, and compact, of a brownish black colour towards the root, and a greyish white towards the tip; it extends considerably beyond the fur, and gives the general colouring to the hide: the fur itself is of a uniform brownish white colour above, and of a somewhat deep brown beneath, and is quite wanting on the extremities. The colour of the body is of a uniform whitish grey above, passing gradually underneath into a reddish white colour, which is deepest in the abdominal region. The upper portion of the extremities is covered above with a very short brownish black hair, which near the body passes into the colour of the back. The under portion of both extremities—to the extent of $\frac{2}{3}$ of the anterior, and nearly the whole of the posterior—are naked, being quite destitute both of hair and fur. The whiskers are brownish black, five rows being present. In one of the specimens there is a dark marking under the eyes. We shall here subjoin the principal measurements of these Edinburgh specimens.

	ft.	inch.	lin.
Length from the snout to the tip of the tail	3	3	0
——— of the tail	0	1	0
——— of the ear	0	1	0
——— from snout to anterior edge of the base of the paw	1	5	6
——— from posterior edge of paw to the root of the tail	1	5	6
——— of fore paw from base to tip	0	11	0
——— of its membranous portion	0	4	0
Greatest breadth of fore paw at base	0	4	0
——— its tip	0	1	8
Length of posterior extremity from base to tip	0	7	0
——— of its membranous portion	0	2	0
Breadth across the back, from the base of one paw to that of the other	1	0	0
Distance from tip of snout to the ear	0	5	6

The angle of the mouth is in the perpendicular of the eye.

To this detailed account of the specimens we must add an important character which is supplied by Captain Weddell. "Nothing," he remarks, "regarding the fur seal is more astonishing than the disproportion in the size of the male and female. A large grown male from the tip of the nose to the extremity of the tail is 6 feet 9 inches, while the female is not more than 3½ feet. This class of the males however is not the most numerous, but being physically the most powerful, they keep in their possession all the females, to the exclusion of the younger branches; hence at the time of parturition the males attending the females may be computed to be as one to twenty, which shows this to be perhaps the most polygamous of large animals."

Habits.—The few particulars which are casually noted by this original observer, are so strongly illustrative of the peculiar habits of this seal, and of many others, that it would be improper here to omit them. "These fur seals," he states, "are in their nature completely gregarious; but they flock together and assemble on the coast at different periods, and in distinct classes. The males of the largest size go on shore about the middle of November, to wait the arrival of the females, who of necessity must soon follow, for the purpose of bringing forth their young. These in the early part of December begin to land, and they are no sooner out of the water than they are taken possession of by the males, who have many serious battles with each other in procuring their respective seraglios; and by a peculiar instinct they carefully protect the females under their charge during the whole period of gestation. By the end of December all the female seals have accomplished the purpose of their landing. The time of gestation may be considered nearly twelve months, and they seldom have more than one at a time, which they suckle and rear apparently with great affection. By the middle of February, the young are able to take the water, and after being taught to swim by the mother, they are abandoned on the shore, where they remain till their coats of fur and hair are completed. During the latter end of February, what are called the dog seals go ashore; these are the young seals of the two preceding years, and such males as, from their want of age and

strength, are not allowed to attend the pregnant females. These young seals come on shore for the purpose of renewing their annual coats; which being done, by the end of April they take the water, and scarcely any are seen on shore again till the end of June, when some young seals come up and go off alternately. They continue to do this for six or seven weeks, and then retire to the water. The large male seals take up their places on shore, as has been before described, which completes the intercourse all classes have with the shore during the whole year. The young are at first black; in a few weeks they become grey, and soon after obtain their coat of hair and fur. Their sense of smell and hearing are acute; and in instinct they are little inferior to the dog; that is, I judge their sagacity in the water much exceeds that which they exhibit on shore; for though they are capable of remaining a certain time on land, their natural element is the water. I have estimated the female to be in general at its full growth within four years; but possibly the male is much longer, and some which I have contrasted with others of the same size, could not from their very old appearance be less than thirty years.

"When these South Shetland seals were first visited they had no apprehension of danger from meeting men; in fact they would lie still while their neighbours were killed and skinned; but latterly they had acquired the habit of preparing for danger by placing themselves on rocks, from which they could in a moment precipitate themselves into the water. The agility of the creature is much greater than from its appearance an observer would anticipate. I have seen them indeed often escape from men running fast in pursuit to kill them. The absurd story that seals in general defend themselves by throwing stones at their pursuers with their tails may be explained in this way—that when an animal is chased on a stony beach, their mode of propelling themselves is by drawing their hind flippers forwards, thereby shortening the body and projecting themselves by the tail, which when relieved by the effort of the fore flippers, throws up a quantity of stones to the distance of some yards."

And now to revert to the identification of the fur seal, we

regret that we are not aware of the existence of a cranium of this species in any of our museums, and therefore we cannot supply its specific characters, or compare them with those of any of the established genera. After the foregoing details however we need scarcely remark that it is a very different animal from the ursine seal, with which M. Lesson, almost the only author, so far as we have perceived, who touches upon this point, has identified it. This intelligent naturalist, who himself spent a considerable time in the antarctic regions, in the able article on the *Phoca* in the 'Dictionnaire Classique des Sciences Naturelles,' expressly says, "L'Otarie de Forster est la Phoque à fourriers des pêcheurs Européens*;" the Otary of Forster, better known under the name of the sea bear or ursine seal. But we have no positive evidence that the ursine seal is a *fur* seal in contradistinction to a *hair* seal, in which latter character it is unquestionably prized. The difference of these two species is, we apprehend, too plain to require much elucidation. Concluding with the illustrious Peron, that the ursine seal of the southern hemisphere is different from that of the northern, which is known as Steller's sea bear, still the descriptions supplied of the southern variety are too specific to leave any doubt on the subject. Dampier† states that at Juan Fernandez the sea bear was found of the size of an ordinary calf; and Forster remarks that those found in New Year's Island, Staten-land, equal the size assigned by Steller to his bear, that is, to that of its terrestrial namesake, of a large size. But in addition to this we have again the valuable testimony of Mr. Weddell. After what has been stated, no one can doubt of his acquaintance with the fur seal. He was also familiar with the ursine seal, both as encountered in its haunts and as described by naturalists‡; and yet when speaking of the ursine seal (so denominated by him) he never once hints that its fur has any peculiar value, but on the contrary excludes it with the others, and ranks it merely as a *hair* seal. Were any further corroboration on this point required it may be found in the testimony of our furriers. We have inquired of a considerable number of them, and especially of M. L'Ry,

* Dict. Class. t. xiii. 422.

† Voyage, p. 137.

‡ Loc. cit. p. 199.

who for years was superintendent of one of the largest fur concerns in the metropolis of the empire, and was in the habit of overhauling great cargoes of south seal skins; and the only response we have obtained is, that there is but one seal which has yielded this particular fur. On visiting M. L'Ry he speedily informed us that he happened to have lying by him a skin of the true fur seal, which he immediately produced, and it appeared manifestly to be identical with the two given by Capt. Weddell to the College Museum. The same gentleman informed us that the fur of this valuable animal is prepared by a process quite different from that employed for the others, the hair being entirely removed, which is done by heating the skin, and then carding it in a peculiar manner with a large wooden knife prepared for the purpose: the fur then appears in all its perfection.

But though we consider it was a decided mistake in that naturalist, who of all others might have been supposed best acquainted with the subject, to confound this fur seal with the ursine, yet, as we before hinted, we think it evident there has been obscure notices of this seal in former and remote periods of the history of the science; and to these it will be now interesting shortly to advert.

It will be remembered by many that in most of our systematic works there is appended to the supposed ascertained species of this interesting group, a list of obscure and doubtful ones which have long maintained their place, without almost anything being known regarding them. In this position we find the *Falklandica* and *longicollis*, both of which we are disposed to consider as the same with the fur seal, and consequently with each other. All our modern systematists, French and English, have ranked the *Falklandica* as an otary; and considering its true value, it is not a little curious that its character and natural history have been so much obscured. This seal seems to have been introduced to notice by Pennant. "There has of late," says he, "been introduced into the Museum of the Royal Society, from the Falkland Islands, another seal, the length of which is four feet; its hair is short, cinereous, tipped with dirty white; the nose is short, beset with strong black bristles; the external auricles are short, narrow and pointed; the upper teeth are sulcated transversely; the

lower in an opposite direction; on each side of the canine there is a lesser or secondary one; the grinders are conoid, with a small process on each side near the base: there are no claws on the fore feet, but underneath the skin there are evident marks of the bones of five toes: the skin extends far beyond their ends. On the toes of the hind legs are four long and straight claws, but the skin stretches far beyond, which gives them a very pinniform look*." Shaw's account is a literal copy of the above; and this appears to have been all the information given to the public by naturalists concerning this seal. We are not therefore to wonder at Baron Cuvier's exclamation, "Que faire de cette Otarie (*O. Falklandica*) cendrée, tachetée de blanc sale? Sont ce des âges, des varietés de l'ours de mer; sont ce des espèces? On ne pourra le savoir que lorsque des individus bien entiers seront décrits en détail à l'extérieur, et au moins pour les parties osseuses de la tête†." Other French naturalists take precisely the same view of this animal which Baron Cuvier did in 1823. Desmarest, three years before, in his 'Mammalogie,' supplied the characters furnished by Pennant without an additional remark. M. Fr. Cuvier in the year 1826‡, and M. Lesson in 1827§, have merely introduced it into a list of little more than bare names, as a species altogether obscure and unascertained; and the last-named distinguished author, in one of the last and best treatises on the seals, in 1828, says of it, "Espèce peu connue et trop incomplètement décrite qu'on puisse l'isoler, ou la rapporter à telle ou telle espèce‖."

Though so much difficulty was thus experienced by these able naturalists, yet we find that the personal observation of Capt. Weddell enabled him at once to identify the *Falklandica* with his fur seal. In relation to this point he unhesitatingly says, "The fur seal is what is called in zoology the *Phoca Falklandica*, the Falkland Island seal, a species which has been distinguished by naturalists by the peculiarity of its shape." Pennant indeed had stated that it came from the

* History of Quadrupeds, 3rd edit. 4to, vol. ii. p. 275.
† Oss. Fossils, tom. v. P. II. p. 214.
‡ Dict. des Scien. Nat. tom. xxxix.
§ Manuel de Mammalog. in loc. cit.
‖ Dict. Class. des Sc. Nat. tom. xiii.

Falkland Islands; but then these dreary regions are, or we must rather say were, rife with many species of seals, and the fur seal has long been exterminated from them: besides he gives no hint of its possessing a valuable fur. The otary which Lesson and Garnat captured at a later period among the Falkland Islands,—the *Otaria Molossina* of the 'Zoologie de la Coquille,' is quite a different animal from this *Falklandica.* The French zoologists, who have laboured most in this department, from not being interested in the trade, seem never to have received any specimens or drawings of this seal; hence these naturalists with all their acumen could have nothing but a partial and imperfect conception of this important species. But it is quite a different matter with a man living in the midst of these animals; to him a hint or two is sufficient to certify its characters and establish its identity. So we believe it was with Weddell; and so will it be with any one who acquires clear and specific notions of the form and appearance of this species, and its most nearly allied congeners.

Still greater obscurity has prevailed, and with less apology, regarding the *longicollis.* This seal is enumerated as a species distinct from the preceding by Pennant and Shaw; and has been arranged by Messrs. Desmarest, Fr. Cuvier, and Lesson among the earless seals or true *Phocæ*; whilst Baron Cuvier with his wonted acumen refers it rather to the *Otariæ*; whilst at the same time he exclaims, "Que faire de cette mauvaise peau du Musée de la Societé Royal, gravée par Parsons, nommée par Pennant *Phoca longicollis**?" In turning to what Parsons denominates Dr. Grew's "excellent book of Rarities" of the Royal Society, which was published in the year 1694, we find that at that date the Museum contained three specimens of seals. Two of these he refers to the species *vitulina,* or common seal; and of the third he remarks, "I find him nowhere distinctly mentioned; he is much slenderer than any of the former; but that wherein he principally differs is the length of his neck; for from his nose to his fore feet, and from thence to his tail, are the same measure: as also, that instead of fore feet he has rather fins, not having any claws thereon, as have the other kinds†." Dr. Parsons, who entertained the Royal Society with

* Loc. cit. † Grew's Catalogue of Rarities, &c. Lond. 1694, p. 95.

a paper on seals in 1750, supplies the next notice concerning this animal; and to Dr. Grew's description he merely adds, "that the head and neck of this species are exactly like those of the otter*." But the most satisfactory witness as to the existence of this animal, if not to the identical specimen, is the illustrious coadjutor of Buffon, in the Paris Museum, and in the publication of the 'Histoire Naturelle.' In their first united treatise, published we believe in the year 1767, we find the learned Daubenton, when treating of quite a different seal, remarking, "I have seen the dried specimens of two individuals of the same kind of seal. The largest appeared full-grown, and was not 2½ (English) feet long, from the end of the snout to the origin of the tail; the neck was longer and the body shorter than the common seal; the fore feet were near the middle part of the whole body, and it had a small external ear. The hair was longer and softer than that of the other seals, being an inch long; it was glossy, waving and curled in some places. It was black on the upper part of the head, neck, and body, and dark brown underneath, and on the feet. On separating the hairs, it appeared they were of a pale fawn colour at the root. The skin of the sole of the foot was naked, and of a brown colour, with very marked rugæ or longitudinal lines; the nails were very small, and the skin which united the toes extended below the nails, and was prolonged much beyond them, and terminated in a divided membrane, each projecting part of which was of a size proportioned to the toe to which it belonged†." This is the animal which is figured in the 47th vol. of the Phil. Trans. From this it will be seen that Dr. Shaw, especially after the time of Daubenton, had no authority, and on the other hand acted alike gratuitously and erroneously in designating this the earless seal of Pennant; by which statement he misled the eminent French naturalists we have named, and was the means of introducing that erroneous classification which has so long prevailed.

Nothing is added concerning the habitat and habits of this seal, or of any œconomic use to which it was applied; which is the less to be wondered at, as probably the value of the fur

* Phil. Trans. vol. xlvii. p. 112.
† Hist. Nat. 4to edit. Tom. xiii. p. 414.

seal was not then known. But influenced by only a becoming deference to these original and respectable, though not quite modern authorities, we think it may be held that these characters thus assigned to their specimens are not equivocal. Daubenton states that he had seen two specimens of the same species, and the other witnesses had examined one individual. The animal they describe differs remarkably from all the previously described seals, and from nearly all that have been subsequently examined; more especially in having the fore paws situated midway between the snout and the tail; it is also an otary, according to the two last witnesses, and moreover it possesses the very singular flippers, apparently peculiar to this tribe of animals. Hence, and from other considerations on which it is unnecessary to enlarge, we conclude that this *longicollis*, like the *Falklandica*, may without hesitation be considered identical with the fur seal of commerce.

Although upon the grounds we have stated we think little doubt can remain regarding the animal which forms the true fur seal of commerce, yet we are persuaded there is still room for fresh and additional inquiry.

We conclude our observations for the present with the following quotation from Lesson. "The Americans," he says, "regard many seals as *fur* seals which are unknown to naturalists, and wholly distinct from each other. Thus, they state that the fur seal of Patagonia has a pump behind its head; that that of California is of very large dimensions; that the upland seal, or that which retreats far from the shore, is small and exclusively inhabits the Macquarrie islands and Pennantipodes; and finally that the fur seal of the south of New Zealand has other and distinctive characters*." Of the seals here alluded to, we have no evidence whether they are to be regarded as fur seals in the more limited sense insisted upon in these pages, and whose peculiar mode of preparation is difficult, and has sometimes been lost sight of; or are fur skins in the more popular acceptation of the term as bear and foxes skins are usually denominated furs. The truth however may be, that many seals would produce in high perfection that article which is now so much desiderated, and yields so rich a return. In

* Dict. Class. des Scien. Nat. tom. xiii. p. 411.

fact, we have seen the skin of another seal, from the South Sea, whose species was unknown, which was dressed as a fur skin, and formed a beautiful manufacture; and the sea otter skin, which is second in value only to the sable, is usually prepared as a *fur* and not a *hair* skin. These hints at all events should be sufficient to excite the attention of the trader and the naturalist, as a matter which is both of commercial and of scientific interest.

XI.—*On* Ononis antiquorum *of Linnæus.* By Edward Forster, F.R.S., V.P.L.S.

Being rather surprised by a remark made to me by an excellent botanist, and assented to by another, that "Mr. Bentham is mistaken in referring in the Supplement to English Botany, our common rest-harrow to *Ononis antiquorum* of Linnæus," I was induced to examine the Linnæan specimen, when, as I expected, I immediately saw that Bentham was decidedly accurate, the specimen agreeing in every respect with *Ononis spinosa* of Hudson, the plant which at this time so beautifully adorns our heaths. On turning to Sir James Edward Smith's own Herbarium, I found a foreign specimen of the plant in question called *O. antiquorum* on the authority of Mr. West, and it is plain that Smith so considered it, by his remark in English Botany, and afterwards in his English Flora, though conceiving it not distinct from *O. arvensis*, he has preferred that name. It is true that the Linnæan specimen is badly dried, but I happen to have one as ill done which corresponds exactly. I have thought it right to say thus much in justice to my friend Bentham as well as for the information of the public.

From looking into Reichenbach's 'Flora Germanica Excursoria,' it has appeared to me probable, that the doubt has arisen from trusting implicitly to that author, who is acquainted with *O. antiquorum* by seeing a specimen gathered by Tournefort, yet asserts that *O. antiquorum Auctorum* is not that plant of Linnæus, but *O. arvensis β. spinosa*, Smith, which he keeps distinct from *O. antiquorum* of Linnæus: in doing so he is in error, for I must maintain that our plant is

properly referred to *O. antiquorum* of Linnæus and to *Anonis legitima antiquorum* of Tournefort, nor have I any reason to doubt its being the *Ononis vel Anonis* of Pliny.

Reichenbach refers our *O. arvensis* to *O. repens*, Linn.: this may admit of some doubt, as the specimen marked *repens* and one from the Upsal Garden marked both *arvensis* and *spinosa*, are by no means so convincing as that of *O. antiquorum*; yet I think it safe to remain as we are, considering the usual and healthy state of *O. arvensis* to be *O. spinosa* and *mitis* of the 'Species Plantarum,' and *O. arvensis* of the 'Systema Naturæ'; when in age the ends of the shoots appear naked, it becomes we suppose *O. spinosa β spinosa*, Sp. Pl., and when buried in sea sands, *O. repens*, Sp. Pl. and Sys. Nat., and we adopt the name of *arvensis* after Linnæus himself, who wisely changed it from *spinosa* to *arvensis* in his twelfth edition of the Systema. I cannot perceive sufficient reason for imagining that Linnæus included *O. hircina*, Jacq., in his *O. spinosa mitis*.

It is much to be regretted that in the last edition of the British Flora no notice is taken of *O. antiquorum*; the synonym of Engl. Bot. Supp. t. 2658. is referred to in such a manner as to imply that the same thing has been twice described and figured; the two plants are not even marked as varieties, though the difference is very striking to those who have seen them in their native places of growth: but as my present object is not to point out the distinction, but to check an unfounded report, I will only add, if further testimony be required, that Professor Don was present when I examined the Linnæan specimen, and his opinion coincided entirely with mine.

4th September, 1838.

XII.—*On the Genus* Syngnathus. By B. Fr. Fries*.

The discovery of the remarkable peculiarity existing in the sexes, by which the males are not only destined as protectors of the eggs and of the birth, but are also for this purpose endowed with a peculiar organ in which the eggs are deposited,

* From the German translation by Dr. Gans of Stockholm, in Wiegmann's Archiv, Part III. 1838.

developed, and hatched, and in which the young in their tender state find a sure protection, has obtained for this genus of late a greater attention than would else have probably been the case. The Royal Swedish Academy contains in its Acts this beautiful discovery of C. M. Eckström, as also the anatomical observations of A. Retzius, which, besides explaining various interesting details respecting the internal structure of these fish, confirmed the above discovery*.

If I at present recall the attention of the Academy to this genus, it is with a view to submit to a systematical examination the species which are admitted in our native Fauna and into that of England, to add to a distinct knowledge of the species by the publication of the results of my personal observations, and to endeavour to reduce the synonymy and nomenclature to a state of better arrangement than that in which I have found it in my predecessors.

It is not uncommon to find in the field of natural history one and the same subject described under many different names, and this can hardly be avoided in the progress of the science. This however is easily discovered, and as soon rectified. But the confounding of well-known and generally adopted names is of much more importance and more apt to cause errors, as such confusion easily escapes the attention of others, and requires for its rectification a long and tedious comparison of authors. With the genus *Syngnathus* it is not only in the old works that we find such errors admitted, but also in the most recent, which renders a revision of the species of this genus the more necessary.

The genus *Syngnathus*, conceived according to the views of Cuvier, forms two subdivisions quite natural, which may most easily be known by the species of the one possessing pectoral fins, while they are missing in all the species forming the second subdivision. To designate the first I shall adopt the Swedish provincial name, and will call them *Tångsnällor* (on account of their quick motions among Algæ), and retain for the

* Latterly Mr. Yarrell has stated that the same discovery was made in 1785 by an Englishman of the name of Walcott, recorded in his unpublished manuscript.

latter the common name *Hafsnålar*. They may be characterized in the following manner:

I. Marsupial Pipe-fish (Tångsnällor). *Syngnathi marsupiales, pinnis pectoralibus instructi.*

Corpore distincte angulato, pinnis caudæ, ani, pectoralibusque radiatis; cauda natatoria. *Mares* in folliculo, marsupii instar, rima longitudinali dehiscente, sub cauda proxima infra anum inserto, ultraque medium caudæ extenso, ova fovent pullosque exclusos includunt.

II. Ophidial Pipe-fish (Hafsnålar). *Syngnathi ophidii, pinnis pectoralibus carentes.*

Corpore tereti, angulis saltem minus conspicuis, pinnis pectoralibus anique nullis; cauda prehensili, longa, gracillima, pinna aut nulla aut rudimentaria. *Mares* in superficie inferiore abdominis ova in cellulis apertis affixa trahunt.

I. Marsupial Pipe-fish*.

To this subdivision belong the two species *S. Acus* and *S. Typhle*, which names Linnæus had adopted in our Fauna. The author, after reviewing the various works treating on this subject, states, "Never having been so fortunate as to find more than one species of *Tångsnällor* I had almost come to the conclusion of excluding *Typhle*, in the impression that our Scandinavian species was the true *Acus*, but when I received Yarrell's beautiful work on the British Fish I immediately saw my error." The author then gives the diagnostic and synonyms of *S. Acus*, which we here omit, as they may be found in the works of Jenyns and Yarrell, and concludes with the remark, "that with the exception of Pennant and Montagu all the English Faunists appear to agree with respect to *S. Acus*, and to them must be ascribed the having first given the true diagnosis between this and the following species (*S. Typhle.*)"

Rare on the Swedish coasts, but common on the English, where it is said to attain only the length of 16 to 18 English inches.

We have then the diagnosis and synonyms of *S. Typhle*, with the following remark: "This is the most common species which occurs on the Swedish coasts both in the Baltic and also in the Cattegat. Its general length at these places is between 9 and 10 Swedish inches. In both seas two coloured varieties

* As what is stated respecting this first division will be found in general in the works of Mr. Jenyns and Yarrell, we have only given an extract of it.

are found; one green with yellow spots and the belly passing into a brass yellow, the other olive brown sprinkled with a quantity of white spots and markings, with whitish belly. These two are also not constant, but between both are a series of transitions. They stand in no definite relation to age or sex."

II. Ophidial Pipe-fish.

If the Swedish Ichthyologists have been guilty of a confusion of names in the other division, the English authors on the other hand have confounded in a remarkable way the species belonging to this division. Our Fauna has hitherto contained only one species, *S. Ophidion*, while the British Fauna has three, *æquoreus*, *Ophidion*, and *lumbriciformis*. However, so far from these names having designated one and the same species with all authors, we here find a great confusion. As late observations have shown that the three species occur on our coasts, I find myself enabled to trace the origin of these errors. With respect to our *Ophidion*, we should least of all expect to find this name in the English Fauna designating quite a different species from the one so called by us, as this appears to be the most rare which occur on the English coasts, and as Englishmen have paid little or no attention to the descriptions of Artedi, but have held to the short specific characters of Linnæus; and these proving to be nsufficient, sought explanation in Bloch, who has been especially unfortunate in the determination of the species of *Syngnathus*. That however which was not to be supposed has really happened; in the most recent works treating of the British fish the name of *Ophidion* is reserved to designate merely the *one sex* of the most remarkable species of this subdivision, while the other sex is received under the right name *S. æquoreus*. Thus we find in Jenyns's 'Manual of Brit. Verteb. Animals,' as also in Yarrell's 'Hist. of Brit. Fish,' both describe rightly the female as *S. æquoreus*, Linn., but call the male *S. Ophidion*, Bloch. I will certainly not maintain that Bloch under his *Ophidion* may not at the same time have included *æquoreus*; on the contrary, I rather consider Bloch's *Ophidion* to be synonymous with the whole subdivision, for the description may be applied partly to the one, partly to the other spe-

cies. The specimen which served for the original of his figure was probably *S. æquoreus*, Linn.* It is quite certain that the name *Ophidion* must be retained for that species to which Linnæus first gave it; which this was, we find without any shadow of doubt in Artedi, who has given a very complete description of it in his 'Descript. Spec.' (P. 1. No. 1). It has also latterly been described by all our Swedish authors, without exception, under the same name. The only thing which we may remark is, that Artedi, and subsequently Linnæus, extended the synonymy too far, including a small distinct species, which Willoughby has described under the name of *Acus lumbriciformis*. This, which appears to be the most common in England, obtained from Pennant and subsequent authors the name *Ophidion*, till Jenyns considered it advisable to transfer this designation to the male of *æquoreus*. The name *lumbriciformis* is then again adopted by that writer, but not more happily applied; since he, without noticing it, describes under this name the true *Ophidion* of Linnæus. This is the only satisfactory explanation I have been able to find of our *Ophidion* also occurring in England. After Jenyns, Yarrell also adopts the name *lumbriciformis*, citing at the same time the description of the former, but himself describing under this name quite evidently the original species to which this name rightly belongs. Although, therefore, none of the above-mentioned authors were acquainted with more than two species of pipe fish, yet, on collecting the species adopted by them, we have the results that three species occur in England, and this is also the case, as I have before mentioned, on our coasts. No cause of doubting their identity with the English species has occurred to me.

Before I enter into the special description of our native species I will direct the attention to certain general peculiarities, which furnish some important points for the specific descriptions.

1. *The position of the anal aperture* in relation to its distance from the snout has already been made use of as a character

* [The only specimen from Bloch's collection is in the Berlin Museum, and probably served as original for the drawing; it is however *S. Ophidion*, agreeing at least with the characters assigned to this species by M. F. Fries. —*Prof. Wiegmann.*]

for distinguishing the species. If this character has been obtained from a comparison of the same sex I would acknowledge its justness, but not otherwise; for the rule, that the anal aperture in the female is at a far greater distance from the snout than in the male, holds good in all pipe fish, and especially in *S. æquoreus* is this distinction between both sexes very remarkable. The age must also be taken into consideration; for if we compare a young specimen with an old one, both of one sex and the same species, we find in the former the distance rather shorter than is the case in the latter.

2. It is worthy of remark, that although the anal aperture in the male is situated closer to the snout than in the female, we still find the same number of plates, and of rings formed of these, in both sexes, both between anus and head as well as between anus and caudal extremity. Hence follows that the number of plates affords a very good character for the species if their enumeration were not connected with some difficulty and uncertainty, as they partly merge into one another, and in living and quite fresh specimens it is almost impossible to distinguish them.

3. *The form of the body* is quite different in the two sexes. We may take it as a rule, that the body in the female is higher and broader, that there is a raised keel or ridge on the back as well as under the belly, which the male, which has a more cylindrical trunk, possesses only traces of under the belly. Although the trunk in living specimens of both sexes scarcely exhibits any traces of three ridges running on each side, with the exception of one species, where they are more prominent; yet they are apparent in all, if they have been laid in spirits for some time or dried.

4. *The length of the head* in proportion to the rest of the body, in all small and long fishes, is not constant; disregarding the difference which age brings with it in this respect. As in young individuals the head is always found relatively longer, we also meet in the *Syngnathi* with considerable individual differences.

5. *The position of the dorsal fins* stands always in a rather constant proportion to the anal aperture, and if not fixed too minutely affords a very good character, which holds good in both sexes.

6. *The rays of the dorsal fins* vary, it is true, in number, as is the case in most fish; but the difficulty of counting them with certainty renders the character which might hence be adduced less applicable, and is undoubtedly the chief cause of the different statements which we find in various authors respecting their number. To be able to determine the number with certainty, the fins must be spread out under water, and the rays counted with the help of a lens.

7. *The colour of the body* is quite characteristic for our native species, if they are examined when alive, although, as in most fishes, it is subject to great variation with respect to markings and depth. The colour is, however, for a diagnosis of a second-rate value, since in order to determine it, it is necessary to have live specimens at hand. It is impossible to judge of the colour of a living specimen from one which has laid in alcohol.

8. *The length of the snout*, in proportion partly to the length, partly to the height of the head, I regard as being the character most easily seized for distinguishing the species, and shall therefore especially employ this character in the diagnoses. The distinction is very perceptible, and indeed no measurement is necessary: but in order to determine distinctly this character by terms, and to leave no room for doubt respecting the scale of measurement, I will previously explain that I take the length of the snout from its extremity to the centre of the eye, and compare this length with the distance from the centre of the eye to the posterior edge of the operculum. I am convinced from numerous comparisons that this character is constant in both sexes and in specimens of different size and age of the same species.

In order to distinguish our three native species in the easiest way, they may be divided as follows into two sections.

* *Pinna caudali rudimentaria e radiis $\frac{3}{3}$ brevissimis composita (parte majore pinnæ dorsalis ante latitudinem ani sita.)*

To this section belongs only one species.

Æquoreal Pipe-Fish, *Syngnathus æquoreus*, Linn.—Trunco sat distincte angulato; longitudine rostri distantiam a centro oculi ad marginem operculi superante.

Syn. S. æquoreus, *Linn. Syst. Nat.* i. p. 417; *Mont. in Wern. Mem.* i. p.

85. pl. 4. f. 1; *Penn. Brit. Zool.* vol. iii. pl. 23. f. 61; *Flem. Brit. An.* p. 176.

♀ = S. æquoreus, *Jenyns's Manual*, p. 486; *Yarrell's Brit. Fish*, II. p. 335.

♂ = S. Ophidion, *Jenyns's Man.* p. 487; *Yarr. Brit. Fish*, II. p. 335.

Stenaale, No. 2, Ström., Söndm. beskrif.

Of all the Scandinavian species of *Syngnathus* this is the largest and most distinguished. It attains a length of 2 feet. The general size of the females amounts to between 18 and 20 inches; the males, which appear to be constantly smaller, are generally met with between 13 to 16 inches in length. The colour is a beautiful burnt or brownish yellow; along the sides run rather wavy whitish oblique stripes parallel to each other, and which are inclosed by a brown frame. Between head and anal aperture are 29 to 30 plates or rings, and between the aperture and the caudal extremity about 70. The dorsal fin consists of 40 to 44 rays, and extends over 12 rings and somewhat over the 13th. The trunk of the female is pretty evidently octangular; then at each side proceed three ridges, a rather sharp keel on the belly, and along the back is a smaller ridge, which appears to pass over into a fold of the skin. The males have a more bordered trunk; the lateral ridges and the ventral keel are more even and the back quite plain, without a trace either of a ridge or a folding of the skin. In the female the anal aperture is situate at about the middle of the body, in the male much more anteriorly. The males have the eggs fastened to the belly in several rows (in 8 to 10).

This beautiful fish was formerly not admitted in the Swedish Fauna; it occurs sparingly if not rarely on the Bohusland coasts.

** *Pinna caudali omnino nulla (parte majore pinnæ dorsalis pone latitudinem ani sita.)*

To this section belong two distinct species, which have previously been confounded one with the other.

Common Pipe-Fish, *Syngnathus Ophidion*, Linn.—Corpore teretiusculo gracili, fere lineari; longitudine rostri distantiam a centro oculi ad marginem operculi æquante; ano circa medium corporis sito.

Syn. S. Ophidion. *Linn. Fn. Suec.* No. 375; *Syst. Nat.* i. 417; *Retz. Fn. Suec.* p. 312. No. 21; *Ekström, Abh. d. Akad. d. Wiss.* 1831. p. 280; *Nilsson, Synops.* p. 488.

S. lumbriciformis. *Jenyns's Man.* p. 488.

Artedi Descript. Spec. p. 1. No. 1. *Synon.* p. 2. No. 4. *Gener.* p. 1. No. 2.

The body is very small and of almost equal breadth; the tail gradually diminishes in size, and almost imperceptibly ends in an extremely fine point. Of all the species this is the longest in proportion to the height of the body, or about the proportion 60·1. The usual length amounts to about 9 to 10 inches. The colour is olive green above, passing into yellow beneath, with a quantity of small, blueish white, frequently round spots at the sides, and above the gill covering with a quantity of minute beautiful azure blue stripes, which proceed abruptly towards the sides of the body. Between head and anal aperture are situated 30 to 31 rings, and from this last to the caudal extremity about 60 and above. The dorsal fin consists of 34 to 38 rays, and extends over 10 segments of the body. The anal aperture occupies in the male nearly the middle of the body; in the females it is found somewhat behind this point. The eggs are placed in 3 to 4 rows.

This species is very easily distinguished from the following one by its longer projecting and somewhat pointed snout, which surpasses in some degree in length (reckoned from the centre of the eye) the greatest height of the head.

It is this species which is so very common on our coasts, occurring both in the Baltic and Cattegat. The females are in greater plenty than the males.

Little Pipe-Fish, *Syngnathus lumbriciformis*, Yarr.—Corpore teretiusculo, crassiore, rostro apice reflexo, breviore, distantiam a centro oculi ad marginem operculi non attingente; ano circa anteriorem $\frac{1}{3}$ longitudinis corporis sito.

Syn. Acus lumbriciform. *Willoughb. Hist. Pisc.* p. 160.—Little Pipe Fish. *Penn. Brit. Zool.* p. 23. No. 62.—S. lumbriciform. *Yarrell, Brit. Fish.* ii. p. 340.

Compared with the preceding species, which most resembles this, we have the body somewhat thicker in proportion to its length, about 1 to 35—40, the tail is also somewhat thicker. This little fish, which only attains a length of 5—6 inches, possesses from its short snout, which is bent somewhat upwards and at the extremities is rather obtuse, an appearance easily recognizable. The usual colour is chestnut brown, which in some is brighter, in others darker; along the back are situated irregular large spots of a whitish grey colour,

which towards the tail become much smaller, and thus give it a kind of marbled appearance. The distance from the nasal extremity to the centre of the eye is shorter than the greatest height of the head, and than the distance from the centre of the eye to the hinder portion of the gill covering. Between head and anal aperture are 19 segments, and between this aperture and caudal extremity about 50.

The dorsal fin consists of 26 rays (in all specimens which I have hitherto examined this has been constant) and extends only over 7 segments. The anal aperture is situated in the male at the anterior third part of the length of the body. The eggs are arranged in four rows.

I discovered this little recruit to our Fauna on the Bohusland coast. Lately I found several specimens, all males, of which two had roes. This pipe-fish is probably not so rare, but all the specimens I obtained were fished up from the bottom of a water 16 fathoms deep, which appears to show that it inhabits deep water; a circumstance, which renders the catching of this small fish so difficult, that it easily escapes. I have never seen it caught on the shores. The female I am unacquainted with.

XIII.—*Enumeration of the Plants collected by* Mr. Schomburgk, *British Guiana.* By George Bentham, Esq., F.L.S.

Mr. Robert Schomburgk was in the year 1834 appointed by the Royal Geographical Society to command an expedition into the interior of British Guiana, with permission at the same time to make, on his own account, collections in the various branches of natural history, one set being deposited in the British Museum. Having procured a certain number of subscribers to the dried plants which he should collect, it was further arranged that Mr. Schomburgk should make them up in sets and forward them to me for transmission to the subscribers, and that each species should be marked with corresponding numbers in the several sets, with a view to identifying them when published.

Mr. Schomburgk, having received his final instructions, left George Town, Demerara, on the 21st of September, 1835; ascended the Essequibo, and its tributary, the Rupunoony, as far as the creek Anna-y, where he established a temporary habitation or head-quarters; made several excursions from thence during a stay of about

three months, and returned to George Town in March, 1836. In the following month of September he again started for the river Courantine, which he ascended in the course of October as far as lat. 4° 21½′ N., and from November of the same year to March, 1837, was spent in an expedition up the river Berbice. In the autumn of 1837 he again ascended the Essequibo and Rupunoony, and from his former post at Anna-y made an excursion to the chain of mountains at the sources of that river, and crossed the ridge to the equatorial line, and returned to Anna-y, from whence the last accounts are dated in February last. Detailed reports of these several expeditions will be found in the Journal of the Royal Geographical Society, vol. vi. p. 224, vol. vii. p. 285, and in the Reports of the Council of the Society for the years 1835–6, 1836–7, and 1837–8, attached to the same journal*.

The length of time thus spent in a tract of country at once so little known, and so varied in aspect, in a quarter of the globe where vegetation is perhaps the richest, would lead us to expect a most valuable harvest as the result; but unfortunately a series of disappointments, arising from serious accidents as well as from the unhealthiness of the climate, counteracted much the persevering endeavours of Mr. Schomburgk. The intermittent fevers, which attacked the whole party in the first expedition, rendered them incapable of taking the necessary precautions to protect their specimens from the unceasing rains, and those which they collected to replace them were lost at one of the rapids in descending the Essequibo; and in the last expedition to the mountains under the line, the difficulty of conveying the indispensable means of support wholly precluded them from carrying the paper requisite for drying specimens of the rich vegetation observed. The whole collection consists, however, of about 700 species, gathered chiefly in the Savannahs about Anna-y and along the Essequibo and Rupunoony, with a considerable number from the shores of the Berbice and Courantine.

The natural orders the most abundant appear to be *Leguminosæ*, *Melastomaceæ*, *Rubiaceæ*, and *Compositæ*; and amongst the most remarkable plants, in orders less abundant in species, may be mentioned the splendid water-lily, dedicated by him to Queen Victoria, some curious new species of *Podostemeæ*, and many *Orchidaceæ* of great beauty. It had been my intention to enumerate the whole collection nearly in the order adopted by DeCandolle in his Prodromus, but as that would require the having previously determined the

* Letters from Mr. Schomburgk, with an account of his journey, will be found in our first volume, p. 63.

whole series, and as circumstances have led me to complete in the first instance some of the larger and more distinctly marked orders, I have thought it might be of service to the subscribers to publish them in the mean time, commencing with the *Compositæ*, which acquire an additional interest from the recent completion of that portion of DeCandolle's Prodromus.

The Museum of Natural History of Paris having recently distributed a collection of above 300 species from French Guiana, and similar sets collected in the same country by M. Leprieur having been presented to several botanists by Baron Benjamin Delessert, I have thought it might be useful to include these two collections in my enumeration, both as enabling their possessors to identify their specimens, and as affording occasionally data for the geographical distribution of particular species.

With a view to the interest of Mr. Schomburgk, whose losses, owing chiefly to repeated attacks of fever, have been very severe, I should add that several sets of about 500 species each remain undisposed of.

COMPOSITÆ.

Tribe Vernoniaceæ.

1. *Sparganophorus Vaillantii*, Gærtn. DC. Prod. 5. p. 11.—Banks of the Courantine and of the Currasawaak. Schomburgk, n. 154 & 206.

2. *Vernonia odoratissima*, H. B. K. DC. Prod. 5. p. 38.—Rocky places in Savannahs on the Rupunoony. Schomburgk, n. 97.

3. *Vernonia scorpioides*, Pers. DC. Prod. 5. p. 41.—British Guiana. Schomburgk, n. 258.

4. *Vernonia tricholepis*. DC. Prod. 5. p. 54.—British Guiana. Schomburgk, n. 282.—French Guiana. Herb. Par. n. 152.

β. *Microcephala*, foliis oblongo-lanceolatis, capitulis parvis.—British Guiana. Schomburgk, n. 149.

Perhaps a different species, but my specimens are too imperfect to determine.

5. *Centratherum muticum*, Less. DC. Prod. 5. p. 70.—British Guiana. Schomburgk, n. 254.

6. *Elephantopus carolinianus*, Willd. DC. Prod. 5. p. 86.—British Guiana. Schomburgk, n. 473 or 413.

This plant, which I have also from various parts of Brazil, is precisely similar to several of my North American specimens. They have the main stem usually corymbose, not dichotomous, and the floral leaves larger than in *E. mollis*, though seldom longer than broad. The *E. nudicaulis*, judging from Drummond's Covington and Jacksonville specimens, appears to be very near the true *E. mollis*. All these species, however, as well as the East Indian *E.*

scaber, run so much into one another as to suggest the probability of their being mere varieties of each other.

7. *Elephantosis angustifolia.* DC. Prod. 5. p. 87.—British Guiana. Schomburgk, n. 612.

8. *Trichospira menthoides*, H. B. K. DC. Prod. 5. p. 91. On the Currasawaak. Schomburgk, n. 153 and 695.

9. *Pectis elongata*, H. B. K. DC. Prod. 5. p. 99.—British Guiana. Schomburgk, n. 184.

Tribe Eupatoriaceæ.

10. *Ooclinium villosum.* DC. Prod. 5. p. 134.—French Guiana. Herb. Par. n. 148 and 151. and Leprieur.

This is without doubt an *Ooclinium*. The leaves are often deeper toothed than is described.

11. *Ooclinium*? *clavatum*, sp. n., suffruticosum? caule tereti striato scabriusculo, foliis oppositis distantibus linearibus trinerviis scaberrimis, paniculæ ramis oppositis apice subtrifidis, ramulis subtricephalis, capitulis subcylindricis circiter 20-floris, involucri squamis imbricatis appressis striatis apice obtusis brevissime appendiculatis deciduis, receptaculo obovato-clavato.—British Guiana. Schomburgk, n. 165.

The very deciduous involucrum is precisely as in *Ooclinium*, with which this species is also connected in habit; the receptacle, however, is not so decidedly oviform, being obconical in the lower part and only slightly convex on the top. Amongst *Eupatoria* it would be nearest related to the *E. obscurum*, DC.

12. *Eupatorium subvelutinum.* DC. Prod. 7. p. 268.—Savannahs of the Rupunoony. Schomburgk, n. 76.

13. *Eupatorium conyzoides.* DC. Prod. 5. p. 143; var. foliis subtus glabrioribus.—Woods of the Paraime Chain. Schomburgk, n. 72. Flowers blue; var. foliis plerisque supra piloso-hispidis.—E. Maximiliani β. hispidulum, DC. l. c.?—French Guiana. Herb. Par. n. 154. and Leprieur.

14. *Eupatorium subobtusum.* DC. Prod. 5. p. 61. French Guiana. Herb. Par. n. 149. and Leprieur.

15. *Eupatorium ixodes*, sp. n., fruticosum, glabrum, viscosum, ramis teretibus, foliis oppositis vel supremis alternis breviter petiolatis oblongis obtusis integerrimis vel hinc inde sinuato-dentatis basi angustatis rigidis penninerviis, paniculæ ramis alternis oppositisque apice corymbosis, capitulis sessilibus pedicellatisque ovatis 25—30 floris, involucri squamis 4—5-seriatis oblongo-linearibus imbricatis dorso subpuberulis, intimis apice breviter ciliatis, achæniis ad costas scabridis.—Savannahs of the Rupunoony. Schomburgk, n. 79.

This species comes nearest to *E. subobtusum*, but is more glutinous, the upper leaves and branches of the panicle usually alternate, and the squamæ of the involucre much more numerous. Flowers, as in

E. Salzmannianum and others of the same habit, pink. Leaves very similar to those of the *Dodonæa viscosa.* Differs from *E. dodoneafolium* by the pubescent achænia, &c.

16. *Mikania racemulosa,* sp. n., fruticosa, scandens, ramis teretibus petiolisque pube fusca scabridis, foliis petiolatis late ovatis acuminatis integerrimis, basi obtusis, supra scabris, subtus subvelutino-pubescentibus irregulariter penninerviis, ramorum floralium parvis triplinerviis, panicula composita, racemis oppositis elongatis terminali longiore, pedicellis bracteola duplo longioribus capitulo subæquilongis, involucri squamis oblongo-linearibus apice fimbriatis, achænio glanduloso.—British Guiana. Schomburgk, n. 480.

Leaves 4 to 5 inches long, about 3 broad. Pedicels numerous, divaricate, about 2 lines long. Flowers white. This species, very well marked amongst the spiciform ones by the flower heads being all pedicellate along the axis, is probably allied in this respect to the *M. Houstonii,* which is, however, described as entirely glabrous.

17. *Mikania Hookeriana.* DC. Prod. 5. p. 195.—British Guiana. Schomburgk, n. 479. Flowers white.

18. *Mikania denticulata.* DC. Prod. 5. p. 198.—British Guiana. Schomburgk, n. 321.

19. *Mikania convolvulacea.* DC. Prod. 5. p. 199.—British Guiana. Schomburgk, n. 93.

20. *Mikania Parkeriana.* DC. Prod. 5. p. 199.—British Guiana. Schomburgk, n. 310.

Tribe Asteroideæ.

21. *Baccharis leptocephala.* DC. Prod. 5. p. 413.—British Guiana. Schomburgk, n. 129.

22. *Eclipta erecta,* Linn. DC. Prod. 5. p. 490.—British Guiana. Schomburgk, n. 331.

Tribe Senecionideæ.

23. *Riencourtia glomerata,* Cass. DC. Prod. 5. p. 501.—French Guiana. Herb. Par. n. 3.

24. *Latreillea glabrata,* sp. n., caulibus glabris subramosis, foliis lanceolatis obscure dentatis integerrimisque, petiolis brevissimis supremis subciliatis, involucri squamis latissime obovatis paleisque receptaculi obtusis brevissime fimbriatis glabris.—Dry Savannahs, British Guiana. Schomburgk, n. 247.

Herba perennis. Rhizoma lignosum. Caules pedales, erecti, simplices vel opposite ramosi. Folia 3—4 pollices longa, 6—12 lineas lata, sub 5-nervia et reticulato-venosa, glaberrima. Capitula 3—7, ad apices caulium et ramorum umbellato-capitata, supra foliorum par ultimum subsessilia, ovoidea, lupuliformia, in vivo nivea, in sicco fusca. Squamæ involucri veri striatæ, demum achænia involventes. Paleæ squamis similes, gradatim minores. Corollæ radii brevissimæ, obscure 3—5-fidæ, supra profundius fissæ, pilis paucissimis articulatis; styli rami exserti, glabri, crassi, acuti. Flores disci tubulosi, antheris concretis ecaudatis, stylo simplici hispido.—Varietas in Brasilia occurrit simillima nisi folia breviora.

By some clerical or other error the n. 247 of Schomburgk has been referred by DeCandolle (Prod. 7. p. 293.) to a very different plant, the *Broteroa trinervata,* which I have not seen in any of the Guiana collections. The true genus *Latreillea* of DeCandolle, with which the present plant agrees perfectly, is very well described in the Prodromus, and is remarkable for its white heads of flowers, drying like the whole plant to a dark brown colour. In addition to the above species and to the two Brazilian ones mentioned by DeCandolle, the two following new ones are contained in Pohl's Brazilian collection.

L. latifolia, glabra, caule striato, foliis late ovalibus obscure crenatis integerrimisque, involucri squamis paleisque receptaculi late obovatis glabriusculis breviter acuminatis subnudis. Folia 4 pollices longa, ultra 2 lata. Capitula numerosa, corymboso-capitata.

The *Torrentia* (or *Torrenia*) *quinquenervia,* Vell. Fl. Flum. 8. t. 149, represents this species very well, except that the stem appears to be hairy.

L. linearis, glabra, foliis longe linearibus integerrimis, involucri squamis paleisque receptaculi breviter et obtuse acuminatis subnudis.—Folia sæpe 3—4 pollices longa, vix lineam lata.

25. *Clibadium asperum.* DC. Prod. 5. p. 506.—British Guiana. Schomburgk, n. 658.—French Guiana. Leprieur.

26. *Clibadium erosum.* DC. Prod. 5. p. 506.—British Guiana. Schomburgk, n. 294.

27. *Unxia camphorata,* Linn. f. DC. Prod. 5. p. 507.—*Pronacron ramosissimus,* Cass. DC. Prod. 5. p. 508.—Dry savannahs of the Rupunoony. Schomburgk, n. 380.

The Linnæan specimen has the double involucrum as described by Cassini. The receptacle has usually a few small unequal paleæ.

28. *Unxia hirsuta,* Rich. DC. Prod. 5. p. 507.—French Guiana. Leprieur.

29. *Acanthospermum xanthioides.* DC. Prod. 5. p. 521.—British Guiana. Schomburgk, n. 663.

30. *Wedelia scaberrima,* sp. n., caule fruticoso, ramis divaricatis hispidis, foliis petiolatis ovatis acuminatis serratis, basi obtusis, supra scaberrimis hispidis, subtus scabro-pubescentibus triplinerviis, pedicellis 1—3 axillaribus terminalibusque folio brevioribus monocephalis hispidis, involucri squamis exterioribus ovali-oblongis extus hispidis, interioribus subæquilongis obovatis obtusis ciliatis, ligulis 6—8 bifidis, achænio puberulo calyculo subbicorni fimbriato-ciliato.—Skirts of woods, British Guiana. Schomburgk, n. 128. Leaves 2 to 3 inches long. Related to *W. pulchella* and *Acapulcensis.*

31. *Wedelia discoidea,* Less. DC. Prod. 5. p. 543.—British Guiana. Schomburgk, n. 650. Capitula sæpissime sexflora.

32. *Wulffia platyglossa.* DC. Prod. 5. p. 563 ?—Dry Savannahs, British Guiana. Schomburgk, n. 185.

The florets of the ray are from six to ten; they are twice as long as the squamæ of the involucre; yet as they are broad, with several veins, as well as on account of the form of the leaves, it is probable that this plant belongs rather to the *W. platyglossa* than to the *W. stenoglossa.*

33. *Bidens bipinnata,* Linn. DC. Prod. 5. p. 603.—British Guiana. Schomburgk, n. 455.

34. *Cosmos caudatus,* H. B. et K. DC. Prod. 5. p. 606.—French Guiana. Herb. Par. n. 150.

35. *Schomburgkia calcoides.* DC. Prod. 7. p. 294.—British Guiana. Schomburgk, n. 474.

A short time before the publication of the seventh volume of the Prodromus a fine Orchidaceous genus was dedicated to Schomburgk, by Lindley, in the second part of his 'Sertum Orchidaceum,' which renders it necessary to change the name of DeCandolle's *Schomburgkia.* I have, however, been unwilling so to do until the publication of the ninth of his 'Collection de Mémoires,' where the plant is figured; as some other generic name will probably there be given to it.

36. *Gnaphalium americanum,* Mill. DC. Prod. 6. p. 234.—British Guiana. Schomburgk, n. 573.

[To be continued.]

XIV.—*Illustrations of Indian Botany.* By Drs. Wight and Arnott.

[Continued from vol. i. p. 395.]

Acalypha ciliata.

Plate V.

Herbacea, spicis androgynis axillaribus densis, floribus superioribus masculis paucis, fœmineis pluribus alternis, involucris hispidis profunde fimbriato-ciliatis, foliis longe petiolatis rhombeo-ovatis acuminatis serratis hispidis.

Acalypha ciliata. *Forsh. Fl. Ægypt. Arab. p.* 162. *Spreng. Syst. Veget. v.* 3. p. 879.

Herbaceous, erect, with few branches. *Stems* hollow, angled, tomentose. *Leaves* alternate, rhombeo-ovate, acuminate, crenato-serrate, ciliate on the margins, slightly hairy on both sides. *Spikes* androgynous, axillary, shorter than the petioles, furnished at the apex with a double stellated appendage, the laciniæ of which are villous: this body Jussieu considers an abortive male flower. *Male flowers* few superior, extremely minute, clustered within one or several small bracteas. *Female flowers* below, numerous, alternate, inclosed within a large, cordate, fimbriated, hairy, persistent *involucre.* *Calyx* of

the *male flowers* of four *sepals*, glandular at the margins. *Corolla* none. *Filaments* of the stamens very short. *Anthers* 2-celled: *cells* separate, elongated, "verruciform." *Sepals* of the female flowers 3, lanceolate, distinct. *Corolla* 0. *Stamens* 0. *Styles* 3, long, divided at the apex into several slender laciniæ. *Capsule* 3-celled, 3-valved; *cells* 4-seeded. *Seeds* ovate, smooth, brown.

Frequent in corn-fields in the Tanjore and Cuddalore districts. The specimen figured is from the neighbourhood of Dindegul.

Plate V. Fig. 1, extremity of a spike; f. 2, one of the stellated appendages from the same; f. 3, scale with female flowers, magnified.

XV.—*New British Insects indicated in Mr. Curtis's Guide.* By A. H. Haliday.

The references are to the genera and species as numbered in the 2nd edition; and where the Appendix is referred to, the number of the column is added.

Coleoptera.

Calathus nubigena, C. 53. 5.

C. subapterus niger antennarum basi thoracis lateribus pedibusque rufescentibus; thoracis basi utrinque leviter impressa, angulis subrectis; elytris leviter striatis: *m. f.* Long. $3\frac{1}{2}$ lin.

Under stones on the top of Sliebh Donard, Downshire.

Omaseus tetricus, C. 37. 9.

Has been lately described under the name *Pterostichus gracilis*, Erichson Köf. M. Brand. i. 72.

Hymenoptera.

Ichneumon phaleratus, C. 484. 153[c].

I. ore orbita scutello et segmentorum marginibus albidis, thorace multifariam albido-lineato; femoribus tibiisque croceis, posticis apice nigris, *m. f.*; facie albida, *m.*; antennarum semiannulo albo, *f.* Long. $3\frac{1}{2}$ lin.

Ireland, on a willow, September.

The characters of this species are intermediate between *Ichneumon* and *Hoplismenus*.

Tryphon hæmosternus, C. 492. 100[b].

T. areola nulla; unguibus denticulatis; pectore pedibusque rufis, tibiis posticis basi albidis, apice et ante basin fuscis; terebra crassa deflexa, *f.* Long. 3—$3\frac{1}{2}$ lin.

On willows, Ireland, May, &c.

Subgenus Cteniscus, C. 492. bis.

Tibiarum Calcaria 1 : 1 : 0. *Characteres reliqui* subg. *Tryphon.*

Tryphon Curtisii, C. 492. 2.

Ct. unguibus denticulatis; scutello et facie albido-maculatis, segmentis summo margine albidis; pedibus rufis, tibiis tarsisque posticis nigris, crassiusculis, *f.* Long. 4 lin.

Ireland, on a willow; June.

Distinguished from *T. gnathoxanthus* and allied species by its more robust figure, and the thickness of the hind tibiæ and tarsi, in which respect it resembles a *Scolobates.*

Tryphon aurifluus, C. 492. 3.

Ct. abdomine rufo basi apiceque nigro, segmentis posterioribus summo margine albidis; facie albido-maculata; pedibus rufis, posticorum femoribus tibiis tarsisque apice nigris, *m. f.* Long. $3\frac{1}{2}$ lin.

On willows, Ireland; May—Sept.

Tryphon phæorrhæus, C. 492. 6.

Ct. pedibus anterioribus ferrugineis, basi nigris; abdominis apice fulvo, *m.* Long. 3 lin.

Obs. To the same subgenus are to be referred *Tryphon lucidulus, sexlituratus, gnathoxanthus, sexcinctus, quinquecinctus, succinctus, cephalotes, triangulatorius,* and several undescribed British species.

Exochus antiquus, C. 493. 213[d].

E. areola quinqueangulari; linea ante alas, facie orbita, pedibusque flavis; posticis basi fulvis, coxis nigris, *m.* Long. 3 lin.

Holywood.

Exochus lictor, C. 493. 222[b].

E. areola nulla; clypeo obtusangulo; capite thorace scutelloque flavo-maculatis; pedibus flavis, posticis basi fuscis, *f.* Long. 3 lin.

Isle of Wight, Sept.? F. Walker.

Exochus pectoralis, C. 493. 222[c].

E. areola nulla; facie orbita, pectore, pedibusque anterioribus flavis; posticis fulvis, tibiis tarsisque albidis, apice fuscis, *m.* Long. $2\frac{1}{2}$ lin.

Eyrecourt, county Galway; September.

Exochus Talpa, C. 493. 226[c].

E. areola nulla; abdominis basi scabricula; scutello immarginato; tibiis anticis ferrugineis, posterioribus summa basi albidis, *m. f.*; antennis thorace non longioribus, *f.* Long. $1\frac{1}{2}$—2 lin.

Ireland, April—May.—England, F. Walker.

Genus PERIOPE, Curtis's Guide, 1st edition. App. 538[a].

Abdomen subpetiolatum postice compressum, elongato-fusiforme. Terebra recondita. Thorax brevissimus gibbus. Antennæ breves subclavatæ. Facies protuberans. Clypeus basi impressus. Pedes breves; calcaria 1 : 2 : 1 ; ungues denticulati. Areola minuta subtriangularis.

Periope auscultator.

P. segmentis 2° et 3° rufis, basi nigris; tibiis tarsisque fulvis, *f.* Long. 4 lin.—Confer *Ichn. impugnator*, Schranck. F. B. 2125.

In a grove of larches, Eyrecourt, Sept.

Genus CRYPTUS.—Subgenus MESOCHORUS.

* Alarum posticarum nervo anali discreto.

Cryptus atricilla, C. 508. 338[a].

M. abdomine compresso petiolato; testaceus, antennis concoloribus, capite abdominisque apice nigris, *m. f.* Long. $6\frac{1}{2}$ lin.

Holywood, August, September.

** Alæ posticæ nervo anali destitutæ.

Cryptus fulgurans, C. 508. 338[c].

M. scutello convexo; abdomine petiolato; totus testaceus, *m. f.* Long. 3—$3\frac{1}{2}$ lin.

Holywood, August, September.

Cryptus olerum, C. 508. 338[b].

The description omitted for the present, as it may prove to be a variety of *C. splendidulus.*

Cryptus Sylvarum, C. 508. 338[e].

M. scutello convexo; abdomine compressiusculo petiolato; pectore rufo; ore orbita pedibusque testaceis; tibiis posticis pallidioribus, basi et apice puncto nigro; terebra brevissima latissima, *f.* Long. 2—3 lin.

Var.—Mesothoracis scuto rufo-bilineato.

England, F. Walker.—Ireland and the Hebrides, in woods, June —August.

Obs. Distinguished from the other species of the present section by its elongate figure and compressed abdomen, and in these particulars approaching *C. alarius* and *atricilla* of the first section.

Cryptus complanatus.

M. thorace deplanate-cylindrico; abdomine breviter petiolato, segmento 1° apice ruguloso; capite, antennis basi, abdominis medio, pedibusque testaceis, coxis posticis fuscis, *f.* Long. $1\frac{3}{4}$ lin.

Var.—Femoribus posticis et apice tibiarum fuscis.

England, F. Walker.

Cryptus arenarius, C. 508. 338[h].

M. scutello convexo; abdomine subpetiolato; mesopleuris punctulatis; tibiis testaceis, posticis apice fuscis, *m. f.* Long. $1\frac{1}{2}$—2 lin.

On *Salix argentea*, Portmarnock, county Dublin, June.

Subgenus Plectiscus, *Gr.*

There is so much dissimilarity among the species included in this group that I would propose dividing it into two, and adding a third for the reception of some small species, which I formerly arranged with *Xorides*, but which agree with the genuine *Plectisci* except in respect of the wings.

Subgenus Helictes, C. 509[b].

Abdomen petiolatum, segmento 1mo attenuato, lateribus sinuato tuberculis mediis. Terebra recondita aut subexerta. Thorax gibbulo-cylindricus. Antennæ graciles involutæ, radicula prominula, scapo bulbiformi, oblique exciso. Areola nulla. Pedes graciles, postici subelongati.

In this group I would place *Cryptus impurator* and *erythrostoma*, Gr.; also the following:

Cryptus fulvicornis, C. 509[b]. 347.

H. abdominis medio pedibusque testaceis, coxis posticis basi fuscis, antennis fusco-testaceis, *f.* Long. 2 lin.

Var.—Segmentis intermediis fusco-cingulatis, etiam coxis posticis totis fuscis.

England, F. Walker.—Ireland.

I think this is the female of *P. erythrostoma.*

Cryptus cruentatus, C. 509[b]. 346.

H. scutello pectore pedibusque rufis, posticorum tibiis apice tarsisque fuscis, *f.* Long. 3—$3\frac{1}{2}$ lin.

Var.—Segmentis intermediis margine castaneis.

In shady places, Ireland.—England, F. Walker.

Very active, and is continually rolling and unrolling the spiral of its antennæ.

Cryptus varius, C. 509[b]. 348.

H. abdominis cingulo pedibusque fulvis, coxis anterioribus, trochanteribus facie, et linea hamata ante alas, albidis, *m.* Long. $2\frac{1}{2}$ lin.

Portmarnock, June.

Subgenus Clepticus (Xorides spp. C. 542.).

Abdomen petiolatum, segmenti 1[i] tuberculis mediis s. anticis. Thorax gibbulus. Oculi magni protuberantes. Clypeus basi impressus semicircularis. Antennæ pedesque graciles. Areola nulla; radius cum cubito medio connivens. Terebra exerta.

Cryptus prætor, C. 542. 15[a].

Cl. antennarum basi pedibusque stramineis, segmento 2° margine et sequentibus ochraceis intermediis fusco-maculatis, *m. f.*; abdomine lanceolato, segmento 1° lineari-elongato lævi, terebra abdominis longitudine, *f.* Long. $3\frac{1}{4}$ lin.

In shady places, Ireland.

Cryptus comes, C. 542. 15[c].

Cl. antennarum basi pedibusque stramineis, abdominis ovati segmento 2° margine et 3° ochraceis, hoc lateribus fusco-maculato, 1° nitido substriato; terebra corporis longitudine, *f.* Long. $2\frac{1}{2}$ lin.

Cryptus socius, C. 542. 15[b].

Cl. antennarum basi pedibusque stramineis, abdominis ovati segmento 2° margine et 3° ochraceis, hoc lateribus fusco-maculato, 1° nitido substriato, terebra $\frac{2}{3}$ abdominis longitudine, *f.* Long. $2\frac{1}{3}$ lin.

Cryptus pagnus, C. 542. 15[d].

Cl. antennis basi subtus pedibusque stramineis; abdominis ovati segmento 2° margine ochraceo, 1° scabriculo canaliculato; terebra $\frac{1}{2}$ abdominis longitudine, *f.* Long. 2 lin.

Eyrecourt, September.

Subgenus Plectiscus.

Areola minuta oblique transversa. Abdomen rarius subsessile, segmenti 1[i] tuberculis anticis. Characteres reliqui ut in subg. *Clepticus*.

Here *Cr. collares. albipalpus, zonatus*, &c. find their place.

Pimpla Senator, C. 516. 113[b].

Eph. segmentis albo-marginatis, intermediis subtransversis, orbitis oculorum internis albis, mesothorace rufo albo-maculato, pedibus rufis, terebra corporis longitudine, *f.* Long. 4 lin.

Intermediate between *P. divinator* and *mediator*, resembling the first by its shorter figure and the form of the radial areolet, the latter in the length of the oviscapt.

Pimpla phœnicea, C. 512. 66[b].

Pol. mesothorace cum scutello rufo, pedibus fulvis, tibiis posticis albidis apice fuscis, ore et antennarum basi subtus albidis, *m. f.* Long. $2\frac{1}{3}$ lin.

A variety, as I now believe, of *P. percontatoria.*

Subgenus ACRODACTYLA (Barypus*, C. 490b.)

Abdomen basi attenuatum, segmentis intermediis obsoletissime impressis; *f.* ventre apice fisso, terebra exerta brevi. Areola nulla. Tarsi apice incrassati, unguibus lobo infero dilatato obtuso.

The species of this little group are closely allied to the subg. *Polysphincta* (and to *P. percontatoria* in particular), but may be distinguished by the smoother abdomen attenuate at the base, the narrower stigma, and the structure of the claws. From certain *Pimplæ* of the typical subgenus which agree in this last respect, they may be known by the want of the areolet, in addition to the former characters.

Pimpla madida, C. 490b. 2.

A. abdomine fusco-piceo incisuris nigris, palpis pedibusque stramineis, posticorum tibiis apice tarsisque fuscis, stigmate fusco, *m. f.* Long. 3 lin.

England, F. Walker.—Ireland, in shady groves.

Pimpla degener, C. 490b. 1.

A. abdomine fusco-piceo incisuris nigris; antennarum basi subtus, palpis, pedibusque stramineis; posticorum tibiis apice, tarsisque fuscis, stigmate stramineo-piceo, metathorace canaliculato, *m. f.* Long. 2 lin.

In the same situations with the last.

Bassus serricornis, C. 522. 36.

Euc. capitis thoracisque picturis, abdominis fasciis quatuor interruptis, coxis anticis et trochanteribus, albidis; metathoracis macula laterali pedibusque fulvis; posticis apice fuscis, tarsis alboannulatis, *m. f.*; antennis medio dilatatis serratis, *m.*; antennis filiformibus, *f.* Long. 4 lin.

Wicklow, June.

Bassus Laricis, C. 521. 30b.

O. areola irregulari subquadrangulari, segmentis intermediis margine antennis pedibusque testaceis, fronte flavo-bimaculata, terebra subexerta, *f.* Long. 2 lin.

On larches, Holywood.

Porizon linguarius, C. 537. 178b.

P. proboscide caput superante; mesopleuris punctatis, sulco laterali nullo; mandibulis, femoribus anticis, tibiisque rufescentibus; terebra corporis longitudine, *f.* Long. 2 lin.

England, F. Walker.

* *Barypus*, a genus of *Carabidæ*.

Obs. The maxillæ and labium inflected in repose extend as far as the coxæ of the intermediate legs.

Genus Atractodes, *Gr.*

* Petiolus condylo triplo longior, gracilis linearis. Abdomen elongatum, feminis apice tantum subcompressum et truncatum.

Atractodes incessor.

A. abdominis medio pedibusque anterioribus rufis, coxis et trochanteribus nigris, *m. f.* Long. 2½—5 lin.

Var.—Tibiis posticis (etiam femoribus basi et subtus) rufis.

Common.

Atractodes dionæus, C. 538. 184.

A. mandibulis (antennis basi subtus), segmentis 2° et 3° basi, pedibusque rufis, coxis posterioribus nigris, *m. f.* Long. 2—2½ lin.

Var.—Femoribus posticis (intermediis basi coxisque) fuscis, *m.*

Not common in Ireland.—England, J. Curtis and F. Walker.

Atractodes scrutator.

A. abdominis medio, mandibulis, pedibusque rufis, *m. f.*; antennis basi rufis, *m.*; antennis nigris, aut subtus basi rufis, *f.* Long. 2¾ lin.

Var.—Femoribus tibiisque posticis puncto apicis nigro, *f.*

Ireland, Hebrides.—England, F. Walker.

** Petiolus condylo ad summum duplo longior. Abdomen modo apice compressum, fusiforme; modo compressum s. subcompressum, dorso fere lineare, a latere lanceolatum.

Atractodes vestalis, C. 538. 182.

A. tibiis testaceis, anterioribus medio posticis apice fuscis; alis hyalinis areola subtriangulari, *m. f.*; abdomine ovato, apice subcompresso, *f.* Long. 2—2⅔ lin.

Common.

This species might perhaps with equal reason be referred to the genus *Stilpnus*; indeed any definite line drawn between these two genera must be arbitrary.

Atractodes gravidus, Gr.

A. mesothoracis sulcis humeralibus subproductis; abdominis medio, femoribus, tibiis, tarsisque rufis; abdominis segmento 1° apice sensim dilatato, *m. f.*; antennis basi subtus rufis, *m.*; antennis validis pubescentibus; abdomine fusiformi apice subcompresso, *f.* Long. 3—3¾ lin.

Rare in Ireland.

Atractodes albo-vinctus, C. 538, 183.

A. abdominis medio, palpis, pedibusque rufis, coxis posticis nigris,

m. f.; antennis albo-annulatis, abdomine fusiformi apice compresso, *f.* Long. 3—4 lin.

Ireland, not common.

Atractodes arator, C. 538. 185.

A. abdominis medio femoribus tibiisque rufis; abdominis segmento 1° lagenæformi, *m. f.*; antennis gracilibus articulis extremis ovatis; abdomine subcompresso, *f.* Long. 3½ lin.

Holywood, not common.

Atractodes Salius, C. 538. 190.

A. antennis basi, abdominis medio, ore, pedibusque, ferrugineis; femoribus posticis fuscis; alis corpore brevioribus fumatis, areola incompleta; abdomine compresso, segmento 1° apice sensim dilatato canaliculato, *f.* Long. 2½—3 lin.

Eyrecourt, September.

Atractodes exilis, C. 538. 188.

A. antennis basi, abdominis medio, ore, pedibusque, ferrugineis; posticorum tibiis apice et femoribus fuscis; abdomine compresso, segmento 1° lineari læviusculo, *f.* Long. 3 lin.

England, F. W.—Ireland, very rare.

Atractodes croceicornis, C. 538. 191.

A. abdominis medio, antennis, ore, pedibusque, ferrugineis, coxis posticis basi fuscis; abdomine compresso, segmento 1° apice sensim dilatato, *f.* Long. 3—3½ lin.

Ireland, rare.

Atractodes bicolor, Gr.?

A. abdominis dorso medio castaneo; mandibulis pedibusque ferrugineis, coxis posticis basi fuscis; areola irregulari subtransversa, *m. f.*; antennis basi testaceis, *m.*; antennis basi subtus ferrugineis; abdomine compresso, *f.* Long. 3—3½ lin.

Var.—Femoribus posticis (mediis basi coxisque) fuscis: *etiam* abdomine antennisque nigris, *f.* Long. 1½—3 lin.

Common.

Atractodes piceicornis, C. 538. 186.

A. abdominis medio mandibulis pedibusque testaceis, coxis posticis fuscis; abdomine fusiformi apice compresso, *f.* Long. 2½ lin.

Eyrecourt, September.

Atractodes fumatus, C. 538. 189.

A. segmento 3° basi femoribus anterioribus tibiisque rufescentibus tibiis posticis apice nigris, *m. f.*; abdomine compresso, *f.* Long. 2½ lin.

Var.—Abdomine toto nigro, *f.*

Not common.

Atractodes cultellator, C. 538. 187.

A. mandibulis pedibusque rufis, coxis posterioribus nigris; abdomine compresso longissimo, medio rufo piceo (pedibus posticis vix breviore), *f.* Long. 3 lin.

Holywood.

Atractodes citator.

A. capite thoraceque punctatis; abdomine compresso, castaneo, basi nigro; femoribus anterioribus tibiisque testaceis, posticis apice nigris, *f.* Long. 3 lin.

Ireland.

Atractodes? properator.

A. abdomine testaceo, petiolo nigro; pedibus testaceis, coxis posticis basi fuscis; areola nulla, *m. f.*; antennis subtus testaceis, *m.*; antennis tricoloribus, abdominis apice compresso, femoribus tibiisque posticis breviusculis, *f.* Long. $2\frac{3}{4}$—$3\frac{1}{4}$ lin.

Var.—Coxis posticis totis pallide testaceis, *f.*

England, F. Walker.—Near Edinburgh, September.

This species differs from all the former in many respects. The spiracles are placed at the middle of the first abdominal segment:—the anterior face of the tibiæ is beset with minute spines:—the proportions of the labial palpi are different, the intermediate joints being very short and the last very long. The antennæ of the male are not crenulate in the middle. The areolet is either totally wanting, or if faintly indicated, it is triangular. Notwithstanding these and other differences I have left it in this group for the present, as it differs yet more widely from *Ichneumon*; neither do I think it can with any propriety be referred to *Mesoleptus*, and I know no other group with which it is likely to be associated.

Genus Lampronota.

Abdomen subsessile læve convexum, *f.*; ventre apice fisso, valvula ventrali obtusa, terebra exerta longa. Thorax gibbulo-cylindricus, mesothoracis scuto bisulco, metathoracis spiraculis transversis. Caput oblatum, clypeo transversim impresso. Antennæ longæ graciles, articulo 3° prælongo, 5° et 6° in mare denticulatis. Pedes postici elongati validi. Areola nulla.

I have adopted the group as restricted by Mr. Stephens in his synopsis of the genera. It has some resemblance to *Echthrus*, but is perhaps more nearly allied to *Acœnites*; I have not a specimen of the latter genus to make the comparison.

Lampronota fracticornis.

L. tibiis tarsisque anterioribus et femoribus rufis, *m. f.*; terebra abdomine sesquilongiore, *f.* Long. 4½ lin.

Var.—Segmentis intermediis summo margine rufescentibus.

England and Scotland, common in woods in autumn, and particularly on the broom.

Lampronota crenicornis, B. E. 407.

L. pedibus rufis, tibiis tarsisque posticis nigris, *m. f.*; terebra abdomine breviore, *f.* Long. 4 lin.

Holywood, not uncommon, July—September.

Lampronota denticornis, C. 511. 14ª.

L. femoribus rufis, tibiis tarsisque anterioribus rufis posticis fuscis; abdomine subopaco, segmentis intermediis summo margine castaneis, *m. f.*; terebra abdomine breviore, *f.* Long. 4 lin.

Ireland, in pine woods, autumn.

The new species indicated in the families *Cyniphidæ, Proctotrupidæ, Diapriadæ* and *Ceraphronidæ* will be noticed in a separate memoir on the British species of those families.

[To be continued.]

XVI.—*Communication respecting Fossil and Recent Infusoria made to the British Association at Newcastle.* By Prof. Ehrenberg.

To the Editors of the Annals of Natural History.

Gentlemen,

You will much oblige me by inserting the subjoined notice, which has been occasioned by the erroneous report in the Athenæum of the statements made by me at the late Meeting of the British Association in Newcastle, in the section of botany and zoology, which statements, so far as I can recollect, were to the following import:—

For the purpose of physiological inquiries I have occupied myself with the investigation of microscopic organized beings, not only in Europe, but also upon several voyages for several years in other quarters of the globe. The results of my observations had been hitherto scattered in single memoirs, published in the Acts of the Royal Academy of Berlin. Within these few weeks, however, my large work on this subject has been com-

pleted*, which consists of a thick folio volume of text and 64 folio copper plates, in which I have endeavoured to bring together the whole of our present knowledge of microscopical beings, with their history in as complete a state as possible. This book, which I had the pleasure of laying before the section, is not (as stated) the first volume of a work, but complete and entire in itself, and is now in the booksellers' hands. It contains drawings of all the 722 species observed by me up to 1835. It is however merely a first essay on this highly interesting and at present inexhaustible subject. I then in a few words directed the attention of the section to the importance of the observation of microscopic beings, as a highly influential zoologico-botanical subject, and exhibited earths which were entirely formed of the shields of some Infusoria. I mentioned the eatable infusorial earth from Lillhaggsjön in Sweden, from Finland, and from Kliecken near Dessau, where they occur in great natural layers. I stated that the greatest layer hitherto discovered was to the height of above 28 feet near Lunebourg; that however similar layers have already been found in Africa, Asia, and the South Sea Islands. At the same time I noticed that I had succeeded in artificially preparing from still existing Infusoria very considerable quantities of earth. I exhibited a large glass full of such artificial siliceous earth, in which the microscope, however, still evidently and distinctly discovers all the forms of the Infusoria constituting it, pounds and tons of which earth may easily be prepared. I mentioned in few words the still existing controversy between botanists and zoologists, both of whom would class in their catalogues these microscopic living forms; and I briefly noticed the reasons given in detail in my work for each opinion, deciding myself in favour of their being animals.

I also said a few words on the luminosity of the sea, which subject in part stands in immediate connexion with these microscopic animals, it being regarded an act of animal life; and I invited attention to the fact that the luminosity in Infusoria and Annulata is an evident voluntary production of sparks, so that in the latter there originates a light apparently continuous or tranquil to the naked eye, from numerous micro-

* Ueber Infusionsthierchen, mit einem Atlas von vier und sechzig Kupfertafeln. Von Christian Gottfried Ehrenberg.

scopic sparks following each other in quick succession. The analogy with electrical phænomena is very close, and it is especially worthy of attention that evidently the smallest animals give the largest sparks, in proportion to the size of their body, and consequently very probably produce the greatest electrical tension.

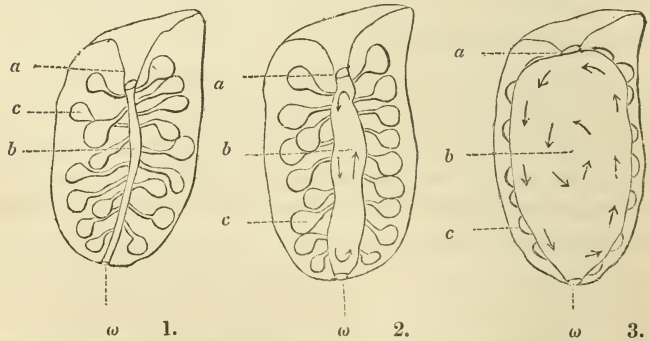
I then mentioned the curious formation of double gems in *Closterium* and in the *Confervæ conjugatæ*, which is figured in the plates of the family of the *Closterinæ*, and I concluded with the remark on the astonishing great fertility or capacity of increase of microscopic animals, according to which an imperceptible corpuscle can become in four days 170 billions, or as many single individual animalcules as contained in 2 cubic feet of the stone from the polishing slate of Bilin. This increase takes place by voluntary division; and this is the character which separates animals from plants. It is true, that the gemmation in plants, especially in very simple cells, is at times very similar to the division in animals, but this relates to the form not the formation. A vegetable cell apparently capable of self division always became one, or contemporaneously many exterior warts (gems) without any change in its interior. An animal which is capable of division first doubles the inner organs, and subsequently decreases exteriorly in size. Self division proceeds from the interior towards the exterior, from the centre to the periphery; gemmation, which also occurs in animals, proceeds from the exterior towards the interior, and forms first a wart, which then gradually becomes organized.

A discussion now arose between Prof. Rymer Jones and me. Prof. Jones observed, that although he had given himself great pains, yet he had never been able to see the structure described by me of the interior organization, viz. of the alimentary canal of the polygastric Infusoria, although he had found the external forms to be exactly the same. He had not been able to discover any trace of an alimentary canal, and in *Paramæcium Aurelia* and other species he had observed a circular motion of the inner cells which could not agree with the formation I had described. I answered him that such discussions then only could lead to a result when they do not merge into general but enter into special cases. The mass of relations of

organization, which after many years of observation have been gradually established, could not be brought into doubt by a single doubtful fact. The perfect organization of the wheel animalcules had been established beyond all question. With regard to *Paramœcium Aurelia*, this is one of those forms unfavourable to such observations; and it had been expressly observed by me that I myself had not been able to recognise the alimentary canal in all species of the various genera; but on the other hand it was quite evident in a very considerable number of species and genera. I stated that in my present work this subject had been treated of in detail, and that those forms in which the relations are perfectly evident have been purposely enumerated. Some of these forms I then exhibited in the drawings, and concluded with the remark that the circular motion observed by Prof. Jones had already been treated of by others (for instance, Dr. Foeke), and had naturally been frequently observed by myself. The great contractibility of the body of the animalcule was, to less practised observers, not seldom a cause of enigmatical phænomena, of which continued patient observation of the object would gradually bring the explanation. Thus, at times, the intestinal canal of the animalcule extends at the expense of the ventral sacs so far, that it occupies the whole space of the body, and then the devoured substances, very similar to the ventral sacs, circulate in the whole body.

Yours, &c.

London, Sept. 15, 1838. EHRENBERG.



Ideal figures of *Loxodes Bursaria* in various states of the extension of the alimentary canal, and its inner circular motion, not of the ventral sacs, but of the contents of the sacs voided into the canal. *a* the mouth, *b* the alimentary canal, *c* ventral sacs, *ω* anal aperture.

XVII.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 52.]

Compositæ s. *Synanthereæ.*

I. CICHORACEÆ, *Lessing.*

1. Scorzonera, *L. DC.*

430. *S.? scapigera* (*Sol. MSS.*) foliis lanceolatis retrorso-dentatis integerrimisve, caulibus gracilibus, scapo unifloro. *Forst. Prodr. n.* 534, absque descript.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Among fern, on the hills, Bay of Islands.—1834, *R. Cunningham.*

Anne vere species hujus generis?

2. Sonchus, *L.*

431. *S. oleraceus. L. Forst. Prodr. n.* 282. *A. Rich. Fl. Nov. Zel. p.* 230. *Engl. Bot. t.* 843.

Pouro-rona, Incol. *D'Urville.*

New Zealand, frequent on the northern and middle Islands.—1773, *Forster.*—1827, *D'Urville.*

3. Picris, *L. Lessing.*

432. *P. hieracioides. L. Willd. Sp. Pl.* 3. *p.* 1556. *Engl. Bot. t.* 196.

New Zealand (Northern Island). On the sea coast, near the Bay of Islands, rare.—1834, *R. Cunningham.*

433. *P. attenuata*, caule erecto glabriusculo vel tenuiter hispido, foliis elongato-lanceolatis attenuatis integerrimis strigosis, foliolis exterioribus involucri laxis.

New Zealand (Northern Island). On the hills, among fern, Bay of Islands. —1834, *R. Cunningham.*

II. VERNONIACEÆ, *Lessing.*

1. Shawia, *Forst.*

Capitulum uniflorum. *Pappus* biseriatus, setaceus, scaber. *Achenium* hirsutum, teres. *Involucrum* turbinatum, imbricatum.

434. *S. paniculata. Forst. Gen.* 48. *tab.* 48. *Prodr. n.* 507. *Lessing. Syn. Gen. Comp. p.* 156. *A. Rich. Fl. Nov. Zel. p.* 243.

New Zealand (Northern Island).—1769, Mercury Bay, *Sir Jos. Banks.* —(Middle Island) 1773, *G. Forster.*

Obs. Caulis arboreus, ramosus. *Folia* alterna, ovato-oblonga, petiolata, undulata, obtusa, supra viridia, glabra, subtus sordide albo-tomentosa, bipollicaria. Paniculæ terminales axillaresque compositæ, pedicelli uniflori, brevissimi. Involucrum imbricatum, cylindricum, foliolis 5—6 oblongis acutis, tribus interioribus longioribus subæqualibus. *Achenium* solitarium oblongum lanatum. *Pappus* pilosus, basi pubescens. (*Ex Forstero.*)

III. ASTEROIDEÆ, *Lessing.* p. 161.

1. Solidago, *L. Lessing.*

435. *S. arborescens,* fruticoso-arborea, paniculis corymbosis erectis terminalibus, foliis ovato-oblongis basi attenuatis petiolatis glabris acutiusculis obtusisve repandis, subtus discoloribus, ramulis angulatis glabris (incanisve, *Forst.*). *Forst. Prodr. n.* 298. *A. Rich. Fl. Nov. Zel. p.* 252.

New Zealand (Northern Island). A tree 12—15 feet high, in dark humid woods on the Kana-Kana and Hokianga rivers.—1826, *A. Cunningham* (Middle Island).—1773, *G. Forster.*

2. Lagenophora, *Cassini, Lessing* *.

Radius uniserialis fœmineus. *Discus* hermaphroditus. *Achenium* plano-compressum, calvum, rostratum. *Lessing.*

436. *L. Fosteri,* foliis orbiculato-spathulatis crenato-serratis piloso-ciliatis petiolo (pollicari) duplo triplove brevioribus, foliolis involucri margine ciliatis, rostro achenio bifido. L. Commersonii, *Cassini in Dict. Sc. Nat.* xxv. *p.* 109. *Lessing. p.* 193. Microcalia australis. *A. Rich. Fl. Nov. Zel. p.* 230. *tab.* 30. Calendula pumila. *Pers. Syn. Pl.* 2. *p.* 492. *Forst. Prodr. n.* 305.

The daisy of New Zealand. *Tupu-tupu* incolis vulgo dicitur.

New Zealand (Middle Island).—1773, *G. Forster.* Astrolabe Bay.—1827, *D'Urville* (Northern Island.)—1769, *Sir Jos. Banks.* Sloping shelves and in swamps on the shores of the Bay of Islands.—1826, *A. Cunningham.* —1834, *R. Cunningham.*

437. *L. lanata,* foliis obovato-oblongis obtusis undulatis dentatis, basi sensim angustatis utrinque villosis, foliolis involucri glabris membranaceis, rostro achenii.

New Zealand (Northern Island). Among fern, between the Waitangy and Keri-Keri rivers.—1834, *R. Cunningham.*

3. Aster, *L. Cass.*?

438. *A.*? *holosericeus. Forst. Prodr. n.* 296. *A. Rich. Fl. Nov. Zel. p.* 248.

New Zealand (Middle Island). On mossy rocks, at Dusky Bay.—1773, *G. Forster.*

Obs. Caules herbacei, 4—5 pedales, erecti. *Folia* radicalia, spathulato-lanceolata, argute dentata seu subserrata, subtus argenteo-holosericea. *Capitulum* solitarium, terminale, amplitudine fere ac in *Astere Chinensi,* L. radiatum.

439. *A.*? *coriaceus. Forst. Prodr. n.* 297. *A. Rich. Fl. Nov. Zel. p.* 250.

New Zealand (Middle Island).—1773, *G. Forster.*

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* The type of this genus, a native of Van Diemen's Land, may be thus characterized: *L. Billardieri*; foliis obovato-oblongis dentatis in petiolum attenuatis, undique pilosis, foliolis involucri glabris, rostro achenio integro leviter dilatato. L. Billardière. *Cassini in Dict. Sc. Nat.* xxv. *p.* 109.—Bellis stipitata. *Labill. Nov. Hol.* 2. *p.* 55. *t.* 205. *Pers. Syn.* 2. *p.* 460.

Hab. In Insula Van Diemen, 1792.—*J. J. La Billardière.*

Obs. Caulis herbaceus. *Folia* ovata, coriacea, integra, supra sulcata, subtus villosa. *Scapus* foliosus, uniflorus, lanuginosus.

"Cette espèce, fort voisine de la précédente, n'en est peut-être qu'une simple variété." *A. Rich. l. cit.*

I have no means of ascertaining to what genus these species, if distinct from each other, belong, as Forster says but little of the real structure of the *achenium*, and nothing at all of the form of the *pappus*. They appear, however, to be species of *Calmisia. Cass.*

4. Haxtonia, *Caley. D. Don.*

Involucrum polyphyllum imbricatum. *Flosculi radii* fœminei ligulati, stigmatibus linearibus obtusis, sulco exaratis, margine incrassatis! *Disci* hermaphroditi. *Achenia* sulcato-angulata. *Pappi* radiis persistentibus, apice penicillatis! *D. Don.*

440. *H. furfuracea*, fruticosa, foliis ellipticis coriaceis petiolatis obtusis, margine undulatis integerrimis dentatisve, supra lævibus subtus argenteo-furfuraceis, corymbis terminalibus, "radiis ternis."—Aster furfuraceus. *A. Rich. Fl. Nov. Zel. p.* 246.—A. elongifolius. *A. Cunn. Ms.* 1826.

Tarata Incolarum fluvii Thames. *D'Urville.*

New Zealand (Northern Island). Banks of rivers, at the Bay of Islands. 1826, *A. Cunningham.*—1834, *R. Cunningham.* River Thames.—1827, *D'Urville.*

Obs. Frutex 6—10 pedalis.

5. Vittaclinia, *A. Richard.*

Capitula radiata. *Involucrum* polyphyllum imbricatum. *Receptaculum* alveolatum. *Semiflosculi* exteriores fœminei longiores, revoluti; flosculi interiores hermaphroditi tubulosi, graciles. *Stamina* 5 libera; antheris linearibus, basi abrupte recurvatis. *Stigmata* duo linearia. *Achenium* teres basi stipitatum. *Pappus* sessilis, fimbriato-pilosus.

441. *V. australis. A. Rich. Fl. Nov. Zel. p.* 251.—Brachycoma spathulata. *Gaud. in Freyc. Voy. p.* 467.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* (Middle Island.) On the sandy rocky shores of the French strait (Passe des Français). Tasman's Bay.—1827, *D'Urville.*

Planta ramosa, erectiuscula, subpilosa, 6—8 uncias alta. *Folia* obovali-spathulata sub 5-loba, lobo terminali majore obtusa. *Capitula* terminalia solitaria. *Flores* radiati.

IV. SENECIONIDEÆ, *Lessing.*

1. Bidens, *L.*

442. *B. pilosa. L. Forst. Prodr. n.* 283. *A. Rich. Fl. Nov. Zel. p.* 235.

Koériki ab indigenis. *D'Urville.*—*Horikike* Incolarum secund. *R. Cunningham.*

New Zealand. Most frequent on cultivated ground, chiefly on the Northern Island. *G. Forster. D'Urville. R. Cunningham.*

2. Cotula, *L. Lessing.*

Capitulum, heterogamum, floribus ♀ uniserialibus sæpe sterilibus in ambitu, reliquis ☿ fertilibus. *Achenium* calvum, flori fœmineo stipitatum, plano-compressum, flori hermaphrodito sessile et angustius.

443. *C. coronopifolia.* *L. Forst. Prodr. n.* 300. *A. Rich. Fl. Nov. Zel. p.* 235.

New Zealand.—1773, *G. Forster.*

3. Myriogyne. *Linnæa*, vi. 219. *Lessing.*

Capitulum heterogamum, floribus ♀ pluriserialibus in ambitu, reliquis ☿. *Achenium* angulatum, exalatum, calvum, conforme.

444. *M. minuta*, foliis subsphathulatis parce serratis, basi sensim angustatis, capitulis minimis oppositifoliis. *Less. Syn. Compos. p.* 266.—Cotula minuta. *Forst. Prodr.* 301. *A. Rich. Fl. Nov. Zel. p.* 235.—C. cuneifolia. *Willd. Sp. Pl.* 3. *p.* 2170.—Grangea minuta. *Lamarck, Poiret, Dict.* x. *p.* 825.

New Zealand (Middle Island).—1773, *G. Forster.* (Northern Island.) Swampy ground at the Bay of Islands. *D'Urville.*—1834, *R. Cunningham.*

4. Soliva, *Ruiz & Pavon.*

(Gymnostyles, *Juss.*)

Cor. florum ♀ pluriserialium in ambitu filiformis persistens et cum ovario continua. *Achenium* apice truncatum bialatum, alis marginalibus. *Less. Syn. p.* 268.

445. *S. tenella*, repens stolonifera, foliis pinnatifidis, apice dilatatis pinnato-lobatis, lobis oblongis incisis.

New Zealand (Northern Island), on the margins of fresh-water streams. —1834, *R. Cunningham.*

Anne species distincta a *Gymnostyles anthemifolia, Juss.*?

5. Craspedia, *Forst.*

(Cartodium, *Sol. Mss.* Richea, *Labill.*)

Capitulum circiter 5-florum. *Rachis* bracteolata. *Pappus* uniserialis, plumosus. *Achenium* erostre. *Less.*

446. *C. uniflora* (melius *Solandri*) foliis orbiculato-spathulatis glabris, margine albo lanuginoso fimbriatis. *Forst. Prodr. n.* 386. *Willd. Sp. Pl.* 3. *p.* 2392. *A. Rich. Fl. Nov. Zel. p.* 245.—Cartodium, *Sol. Mss.*

New Zealand (Middle Island).—1769, *Sir Jos. Banks.* Shores of Queen Charlotte's Sound, Cook's Strait.—1779, *G. Forster.*

Quid *Craspedia fimbriata* (*Forst. Mss. in Herb. Mus. Par. ex DC.*) in litt. e Nova Zelandia (conf. Endl. in Ann. der Wien. Mus. Band 1. p. 109?)

6. Cassinia, *R. Br.*

Involucrum imbricatum, scariosum, pauciflorum. *Receptaculum* paleis distinctis squamis intimis involucri subsimilibus. *Flosculi* tubulosi vel omnes hermaphroditi vel paucissimi fœminei angustiores in ambitu. *Antheræ* (inclusæ) basi bisetæ. *Stigmata* apice obtuso subtruncato hispidulo. *Pappus* pilosus seu penicillatus, persistens.

447. *C. leptophylla*, foliis lineari-lingulatis subter ramulisque incanis corymbis terminalibus, involucris turbinatis. *Br. in Linn. Soc. Tr.* 12. p. 126. —Calea leptophylla. *Forst. Prodr. n.* 287. *Willd. Sp. Pl.* 3. *A. Rich. Fl. Nov. Zel. p.* 234.

New Zealand (Northern Island).—1769, *Sir Joseph Banks.* Sandy ridges on the shores of the Hokianga river.—1826, *A. Cunningham.* (Middle Island.)—1773, *G. Forster.*

Obs. Upon further examination of the specimens gathered on the shores of the Hokianga river in 1826, and at that period considered an unpublished species of *Cassinia,* I am now disposed to view it as Forster's plant.

7. Ozothamnus, *R. Br.*

Involucrum imbricatum, scariosum, coloratum. *Receptaculum* epaleatum, glabrum. *Flosculi* (pauciores quam 20) tubulosi vel omnes hermaphroditi vel paucissimi, fœminei angustiores in ambitu. *Antheræ* (inclusæ) basi bisetæ. *Stigmata* apice obtuso subtruncato hispidulo. *Pappus* sessilis, pilosus, nunc penicillatus, persistens.

448. *O. pinifolia* (*R. Br.*) foliis lanceolatis acerosis glabriusculis margine revolutis, corymbo terminalibus congestis, ramulis tomentosis.—Calea pinifolia. *Forst. Prodr. n.* 288. *Willd. Sp. Pl.* 3. *p.* 1795. *A. Rich. Fl. Nov. Zel. p.* 234.

New Zealand (Middle Island).—1773, *G. Forster.*

8. Helichrysum, *Persoon.*

449. *H. bellidioides. Pers. Syn.* 2. *p.* 415. *Willd. Sp. Pl.* 3. *p.* 1911.—Xeranthemum bellidioides. *Forst. Prodr. n.* 293. *A. Rich. Fl. Nov. Zel. p.* 242.

New Zealand (Middle Island), Cook's Strait.—1769, *Sir Jos. Banks.*—1773, *G. Forster.*

Obs. Caulis herbaceus, gracilis, ramosus, spithamæus, ramulis apice capitulo unico terminatis. *Folia* obovalia, obtusa, apice mucronata, amplexicaulia, superne viridia, subtus cano-tomentosa. Flores magnitudine *Bellii minuti. Involucrum* explanatum, foliolis interioribus longioribus linearibus albis externe ima basi tomentosis. *Receptaculum* planum, nudum.

9. Gnaphalium, *R. Br.*

Capitulum multiflorum, floribus ♀ numerosis, pluriserialibus in ambitu. *Pappus* pilosus, uniserialis, conformis. *Stylus* ☿ ramis apice solo penicillatis. *Achenium* erostre. *Rachis* tota ebracteolata.

450. *G. luteo-album. L. Willd.* 3. p. 1871. *A. Rich. Fl. Nov. Zel.* p. 236. *Endl. Prodr. Fl. Norf.* p. 50. *Engl. Bot.* t. 1002.

Ponkatea, incol. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* River Thames.—1827, *D. Urville.* Bay of Islands.—1833, *R. Cunningham.*

451. *G. simplex,* herbaceum, caule simplicissimo lanato, foliis inferioribus obtusis caulinis oblongo-linearibus subacutis integris utrinque albo-lanatis, floribus capitatis. *A. Rich. Fl. Nov. Zel.* p. 237.

Pon-katea vulgo dicitur. *D'Urville.*

New Zealand (Middle Island). Rocky shores of the harbour of L'Astrolabe.—1827, *D'Urville.* (Northern Island). Bay of Islands.—1834, *R. Cunningham.*

452. *G. lanatum*, herbaceum lanatum, foliis linearibus oblongis apice calloso-mucronatis, corymbis coarctatis, caule simplicissimo. *Forst. Prodr. n.* 290. *Willd. Sp. Pl.* 3. *Endl. Prodr. Fl. Norf. p.* 50. *A. Rich. Fl. Nov. Zel. p.* 238.

New Zealand (Middle Island). Astrolabe Harbour.—1827, *D'Urville.*—1773, *G. Forster.* (Northern Island.) On the hills near the Keri-Keri Mission Station.—1834, *R. Cunningham.*

453. *G.* (Lasiopogon) *involucratum*; herbaceum caule erecto simplici, foliis lineari-lanceolatis acutis, margine revolutis, supra parce subtus tomentoso-lanatis, capitulis axillaribus sessilibus ad ramulorum apices approximatis. *Endl. Prodr. Fl. Norf. p.* 50. *Forst. Prodr. n.* 291. *Willd. Sp. Pl.* 3. *A. Rich. Fl. Nov. Zel. p.* 241.—Enchiton Fosteri, *Cassini in Dict. Sc. Nat.* lvi. *p.* 216.

Ponkatea seu *Poaklimon*, incol. *D'Urville.*

New Zealand (Middle Island).—1773, *G. Forster.* Astrolabe Harbour.—1827, *D'Urville.* (Northern Island).—1769, *Sir Jos. Banks.* Bay of Islands.—1833, *Rich. Cunningham.*

454. *G. Keriense*, herbaceum, caule adscendente, foliis lineari-lanceolatis acutis enerviis sessilibus semiamplexicaulibus, margine revolutis, supra lævibus viridibus subtus albo-argenteis, pedunculis terminalibus lanatis, corymbo laxo.

New Zealand (Northern Island). In the vicinity of the falls of the Keri-Keri river. Bay of Islands.—1833, *R. Cunningham.*

455. *G. trinerve*, fruticosum, caule adscendente tereti lævi, foliis lanceolatis acutis sessilibus trinerviis supra glabris subtus albidis (lanugine explanata relucente) panicula corymbosa terminali laxa. *Forst. Prodr. n.* 289. *Willd. A. Rich. Fl. Nov. Zel. p.* 239.

New Zealand (Middle Island). Dusky Bay.—1773, *G. Forster.*—1791, *A. Menzies.*

10. Arnica, *Cassini?*

Capitulum radiatum. *Pappus* conformis, setaceus, uniserialis. *Stylus* disci ramis pube longa descendente obsessis truncatis aut cono brevi superatis. *Less.*

456. *A.? operina. Forst. Prodr. n.* 299. *Willd. A. Rich. Fl. Nov. Zel. p.* 232.

New Zealand (Middle Island). Dusky Bay.—1773, *G. Forster.*

Obs. Caulis fruticosus, orgyalis, diffuse ramosus, lævis. *Folia* conferta, spathulato-lanceolata, patentia, petiolata, acuta, profunde crenata, crenis apice cartilagineis luteis, supra glabra, viridia, trinervia, subtus albo-lanata, palmaria. *Pedunculi* solitarii, terminales, uniflori. *Flores* ampli, disco luteo. *Corollulæ* hermaphroditæ numerosæ in disco, fœmineæ plurimæ in radio, ligulatæ, ligula lanceolata 3-dentata.

An spec. *Gerberæ* Cass. (Dict. Sc. Nat. xviii. p. 459)?

11. Senecio, *L. Lessing. Syn.* p. 391.

Capitulum heterogamum, rarius homogamum. *Pappus* pluriserialis setaceus, caducus, rectus, subæqualis, conformis. *Stylus* ☿ ramis truncatis

apice solo penicillatis. *Achenium* erostre apterum, teretiusculum, glaberrimum seu hirsutiusculum.

457. *S. lautus* (*Sol. MS.*) corollis revolutis, foliis oblongo-lanceolatis petiolatis æqualiter serratis, summis integerrimis. *Forst. Prodr. n.* 535. *Willd. Sp. Pl.* iii. *p.* 1981. *A. Rich. Fl. Nov. Zel. p.* 257.

New Zealand.—1769, *Sir Jos. Banks.*

458. *S. australis,* foliis lanceolato-linearibus acutis glabris coriaceis integerrimis aut basi utrinque dente lineari auctis, floribus radiatis corymbosis, radio subreflexa. *A. Rich. in Sert. Astrolab.* 131. *t.* 39. *Willd. Sp. Pl.* iii. *p.* 1981. *A. Rich. Fl. Nov. Zel. p.* 257.—S. angustifolius. *Sol. Mss. Forst. Prodr. n.* 539. *non L.*—S. dryadeus. *Sieber, non L.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.*

459. *S. neglectus,* foliis subcarnosis amplexicaulibus pinnatifidis glabris aut pilosiusculis, segmentis plus minus profundis acutis, pedunculis paucifloris, radiis revolutis. *A. Rich. Fl. Nov. Zel. p.* 258.

New Zealand (Middle Island). Astrolabe Harbour.—1827, *D'Urville.*

466. *S. argutus,* caule stricto striato, foliis basi sagittatis lanceolatis argute serratis pinnatifidis subtus albidis supremis linearibus integris, floribus paniculatis, flosculis interioribus 5-dentatis. *A. Rich. Fl. Nov. Zel. p.* 258. *Endl. Prodr. Fl. Norf. p.* 51. *Sert. Astrolab. p.* 101.

Pon-katea, incol. *D'Urville.*

New Zealand (Middle Island). Pebbly shores of Astrolabe Harbour.—1827, *D'Urville.* (Northern Island.) Bay of Islands.—1834, *R. Cunningham.*

461. *S. quadridentata,* caule erecto striato niveo-tomentoso lanuginoso, foliis lineari-lanceolatis subacuminatis tomentosis integerrimis margine reflexis, floribus corymboso-paniculatis, flosculis hermaphroditis 4-dentatis. *Willd. Sp. Pl.* iii. *p.* 1973. *Labill. Nov. Holl.* ii. *p.* 48. *t.* 194. *A. Rich. Sert. Astrolab. p.* 101.

New Zealand (Northern Island). Sea coast near the Bay of Islands.—1834, *R. Cunningham.*

462. *S. hispidulus,* caule subsimplici, foliis lanceolato-linearibus acutis tuberculato-hispidulis, margine subrevolutis distanter at inæqualiter serratis, infra albido-pilosis, ima basi utrinque et approximate bidentatis, floribus parvulis corymbosis, flosculis 3—5-fidis, laciniis ovalibus acutis. *A. Rich. Sert. Astrolab. p.* 92. *t.* 34.

New Zealand (Northern Island). Among fern at Wangaroa.—1833, *R. Cunningham.*

12. Brachyglottis, *Forst. Char. Gen.* 46. *t.* 46.

Capitulum radiatum, radiis brevissimis recurvis tridentatis. *Pappus* densus plumosus caducus. *Achenium* erostre teretiusculum sulcatum.

463. *B. repanda,* paniculis decompositis divaricatis terminalibus, foliis elliptico-ovalibus petiolatis repando-sinuatis, supra lævibus, subtus albo-tomentosis, caule arboreo. *Forst. loc. cit.*—Cineraria repanda. *Forst. Prodr. n.* 295. *Willd. Sp. Pl.* iii. *p.* 2076. *A. Rich. Fl. Nov. Zel. p.* 250.—C. dealbata. *Sol. Mss. in Bibl. Banks.*

Puka-Puka or *Buka-buka*, indig. *R. Cunningham.*

New Zealand (Middle Island). Queen Charlotte's Sound.—1769, *Sir Jos. Banks.* (Northern Island.) River sides, Bay of Islands.—1826, *A. Cunningham.* Wangaroa.—1834, *R. Cunningham.*

Obs. Arbor 10—15 pedalis.

The natives call a letter or paper *Buka-Buka*, from the English word *book*, a quantity of paper bound together; so, where paper has been wanting to write a letter, the ample leaf of this plant has been used in New Zealand by Europeans, the white underside, even in its recent state, taking ink or diluted pigment extremely well; hence the modern name of the plant by the natives *Buka-Buka*!

464. *B. rotundifolia*, paniculis paucifloris foliis petiolatis ovato-subrotundis integerrimis subtus tomentosis. *Forst. Char. Gen. n.* 2.—Cineraria rotundifolia. *Forst. Prodr. n.* 294. *Willd. A. Rich. Fl. Nov. Zel. p.* 254.

New Zealand (Middle Island.) Dusky Bay.—1773, *G. Forster.*

465. *B. Rani*; paniculis ramosis multifloris terminalibus, foliis petiolatis lato-ellipticis acuminatis repando-serratis, supra glabris, subtus niveo-tomentosis, caule arboreo.

Rani, incol. *Rich. Cunningham.*

New Zealand (Northern Island). Banks of rivers, Bay of Islands, &c.—1834, *R. Cunningham.*

Obs. Arbor sæpe 3-orgyalis et ultra, ramosus; rami valde patentes. *Folia* alterna, elliptica, grosse serrata, subrepanda 2—4 pollicaria. *Petioli* patentes vix longitudine dimidii folii, supra canaliculati.

The plumose pappus, the short rays of the female florets, and the form of the achenium, appear sufficient to justify the separation of these plants from *Cineraria*, to which Forster referred them in his 'Prodromus', some years after he had published the genus *Brachyglottis*, which Persoon thinks ought perhaps (for the above reason) to be restored, although Forster's second view has been adopted by Willdenow. Lessing more recently, (1832) whose Synopsis Compos. appears now to be the text-book in this vast tribe of plants, considers them species of *Senecio*. He says, "Genus *Brachyglottis*, Forster's (pappo plumoso) *Jacobæa*, Thunb., generaque Cassiniana, *Grammarthion*, *Dorobæa*, *Obojæa* (Senecionis seu 2. L. radio revoluto), &c. non sunt separatu dignæ" ab *Senecione*.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Illustrations of the Zoology of South Africa; consisting chiefly of Figures and Descriptions of the objects of Natural History collected during an Expedition into the interior of South Africa in the years 1834, 1835, *and* 1836, *fitted out by the "Cape of Good Hope As-*

sociation for exploring Central Africa." By Andrew Smith, M.D., Surgeon to the Forces and Director of the Expedition. 4to. Nos. I. II. Smith, Elder, and Co., London, 1838.

This is the work devoted to natural history alluded to in our notice of the 'Zoology of the Beagle' which has received the support of Government by a grant of money to defray the expenses of engraving the plates, &c., and being thus in a manner public property, we shall have little hesitation in expressing our opinion regarding it. It is a selection from the zoological collections brought home by the expedition which some years since penetrated into Central Africa under the care and superintendence of Dr. Smith, to whose persevering zeal in the pursuit of natural history we are mainly indebted for the whole plan and execution of the journey. That gentleman we believe spent some part of his early career as a student in the University of Edinburgh at the period when Dr. Barclay as a private lecturer gave a new impulse to natural science by undertaking a series of lectures on comparative anatomy. These lectures, novel at the time, and attended at first by many as being so, gave a different turn to the minds of young men entering the medical profession, and called on at an early period to go abroad. Many began to trace the beautiful gradations and analogies of structure in the frames of the singular animals inhabiting the different countries they visited. We can with confidence affirm that many an hour was thus spent which might otherwise have been thrown away; and the Barclayan Museum in the Hall of the College of Surgeons in Edinburgh will bear testimony of the assiduity with which many a pupil wrought to add something to the collection of his admired and respected teacher. Dr. Smith appears to have imbibed much of this zeal, and when entering on the duties of his profession in a foreign station soon gave evidence that he had not attended these lectures in vain—for not only was the direction of the Museum at Cape Town much improved, but several valuable and novel additions were made to it by his exertions; and the country, which had been explored by Sparrman and Barrow, and Le Vaillant, was still found to contain materials unknown and of vast interest to the zoologist. An active mind could not however rest within the boundaries of the colony, or even within the range of some of our enterprising modern travellers; and after several excursions of considerable extent, the journey we have alluded to was planned and executed, and the first portion of the result is now before us.

Had this work appeared ten or twelve years since, we and others would have held it as a beautiful production and scarcely to be ri-

valled. The numbers before us are no doubt beautiful, but we have lately seen so much of the luxury of illustration that we are perhaps spoiled and become too fastidious. The work is, comparatively speaking, moderate in price, and the figures will answer every purpose of the naturalist; but knowing at the same time what London can do in this department, and knowing also that a large sum of money (£1500)* has been voted by the Treasury for its use, we should have liked to have seen every part finished in the highest style of art. The plates, entirely lithographic, want boldness, and in some instances clearness, or decision in the outline and markings. Lithography suits some subjects beautifully, but in a work like that before us a combination of styles should be used wherever one was more suitable than another to the subject, and in the representations of most of the Mammalia engraving or etching produces the more natural effect. The backgrounds and stumps are extremely careless; witness the accompaniments to *Echinorhynus obesus*, where it may be difficult to say what it is intended to represent. Diagrams of the teeth, &c., and other structures, should be introduced either on separate plates or as wood-cuts; the latter is the most convenient and does not entail more expense. The descriptive part is clear, distinct, and scientific, just what it should be; and we can only wish that "the more detailed account of the manners and habits" proposed to be given in an appendix, "hereafter to be published," had been given now.

Each number contains ten plates, published miscellaneously, but numbered so that each department may be arranged separately. In No. I. we have *Rhinoceros Keitloa*, Smith, a new species, and contrasted with the *R. bicornis*, Linn., to which it is somewhat allied. Dr. Smith considers that this animal does not now range higher than about 25° S. latitude, though some time back they must have frequented the vicinity of Latakoo; but from the evidence which was collected from the natives he is of opinion that at least another distinct and at present unknown species still remains to be discovered. 3. *Falco semitorquatus*, Smith. 4. *Chizærhis concolor*, Smith. Judging from the figure we should consider this bird more closely allied to *Corythaix* of Illiger; it was first met with at nearly 25° S. latitude; it perched on the highest branches of trees, flitting to and fro in search of fruits. 5. *Sterocles gutturalis*, Smith, discovered about 80 miles eastward of Latakoo. 6. *Otis ruficrista*, Smith.

* These instances of the partial patronage of science by the Treasury have, we find, caused some dissatisfaction, as being questionable on the score of favouritism, and of the disadvantage at which others have to appear, unaided, before the public; and not merely unaided, but subjected to excessive fiscal burthens, through the Post Office, the advertisement duty, the surrender of copies to privileged libraries, &c. &c.

7. *Sternotherus Linneotus*, Sm. 8. *Varanus albogularis*, Daud. 9. *Bucephalus viridis*, Sm. 10. *Echinorhynus obesus*, Sm.; a species of shark, taken, though rarely, at the Cape of Good Hope; and it is worthy of notice, that at a late Meeting of the British Association Mr. Strickland exhibited a drawing of an undescribed shark, taken on the Yorkshire coast, very closely allied in appearance to this, and coming into the same genus. No. II. contains: 1. *Erinaceus frontalis*, Sm., a good figure of a hedgehog, obtained in the districts around old Latakoo. 2. *Herpestes badius*, Sm., from the same locality. 3. *Sciurus Cepapi*, Sm. 4. *Prionops Talacoma*, Sm. 5. *Crateropus Jardinii*, Sm. 6. *Euplectes taha*. 7. *Philatœrus lepidus*, Sm. 8. *Merops Bullockioides*, Sm. 9. *Pterocles variegatus*, Burchell. 10. *Echidna incrassata*.

Archiv für Naturgeschichte. In Verbindung mit mehreren Gelehrten, herausgegeben von Dr. Ar. Fr. Aug. Wiegmann, Professor an der Friederich Wilhelms-Universität zu Berlin. Vierter Jahrgang. Zweites Heft. Berlin, 1838.

[Continued from Vol. I. p. 321.]

The present part contains several very interesting papers, which we can but briefly notice in this place. The first article, 'Remarks on the Caspian Sea,' by Prof. E. Eichwald of Wilna, has for its principal object to establish that the Caspian is independent of the Black Sea, a conclusion founded upon its different Fauna. Most of the fish found in the Caspian are fresh-water fish; there are however several peculiar species from genera which hitherto have been observed in salt water only. Several new species of fish are described by the author, of which we can merely mention the names. The most numerous tribe inhabiting this sea, are the *Cyprinidæ*, some of which are quite peculiar to it. The following are those described as new: *Cobitis caspia*, *Clupea caspia*, *C. pontica*, *Atherina caspia*, *A. pontica*. A new genus allied to the family of the *Gobiæ*, the diagnosis of which is as follows:—

Benthophilus. Caput depressum, dilatatum, alepidoti trunci instar verrucis aculeigeris undique obsitum, operculum branchiale aculeato-verrucosum, apertura branchialis exigua lateralis, pinnæ abdominales sub pectoralibus infixæ medio connatæ, pinna dorsi duplex, priore 3-radiata.

Benthophilus macrocephalus, *Gobius sulcatus*, *G. affinis*, *G. caspius*, *Syngnathus nigrolineatus* and *S. caspius*. Among the Amphibia we find mentioned as most remarkable, *Clemmys caspia* and *Tropidonotus hydrus*. *T. scutatus*, Pall., the author considers to be merely a black variety of *T. natrix*; the same is the case with *T. persa*, Pall. The sea

is very poor in Crustacea, of which the author notices two new species, *Gammarus caspius* and *Stenosoma pusillum.* It is also exceedingly poor in Mollusca compared with the Black Sea, which is ascribed to the following cause;—that the sea is continually dissolving and taking up great quantities of salt, numerous beds of which occur in the neighbourhood, at Baku, Sallian, and towards the east coast, and in the hot summer the constant evaporation concentrates the salt water to such a degree as to render it unfit for the preservation of animal life.

2. On the dentition of the whale, by Prof. Wiegmann.

3. Remarks on the skulls of *Lutra* and *Spalax*, by H. Nathusius.

4. Cheloniorum Tabula Analytica, auctore Carolo L. Bonaparte.

5. A highly interesting paper on *Evadne Normanni*, a hitherto unknown Entomostracon, by M. Lovèn. The *Evadne* forms a new genus, and the author has named the only species with which he is acquainted after the distinguished naturalist Alex. v. Nordmann, Professor at Odessa. The author has given a detailed anatomy of the various organs, comparing them with those of *Limnadia, Daphnia, Lynceus* and *Polyphemus.* It is a very lively animal and its motions are more regular than those of *Daphnia.* It never proceeds in a straight, but generally in a zigzag direction. The scanty knowledge of the exotic forms, and the dissimilarity of some of the known genera, for instance *Daphnia* and *Cyclops, Cypris* and *Apus*, which undoubtedly will have to be widely separated when we have become acquainted with more forms, renders the systematizing at present very difficult. *Evadne* may be considered as a link, and is most closely allied to *Polyphemus*, Müll.; it may be easily distinguished by its enormous thorax.

6. On *Limosa Meyeri*, Leisl., and *L. rubra*, Briss., by Drs. Hornschuch and Schilling. The specific difference of these two birds has long been doubtful; to settle this point the authors examined and compared a vast number of individuals, and have established the following specific distinctions:—

Limosa Meyeri, Leisl. Crown of the head flat; forehead extended, from the posterior angle of the nasal aperture to the anterior edge of the eye, in the male 10 lines, in the female 11 to 12 lines; lorum blackish brown, distinct; the tail white, banded with blackish brown.

Limosa rufa, Briss. Crown of the head prominent; forehead short, from the posterior angle of the nasal aperture to the anterior edge of the eyes 8 lines, in the female? lorum blackish brown only intimated; tail white, and banded with blackish brown.

Summer clothing of the old male.—L. Meyeri, Leisl. The entire

under surface of the body *dusky brown*. *L. rufa*, Briss. The entire under surface of the body *dusky red*.

Summer clothing of the old female.—*L. Meyeri*, Leisl. Neck and gape tinted with bright dusky brown, with numerous blackish brown cross bands and longitudinal stripes; breast white, with large dusky brown spots; the sides blotched with blackish brown cross bands and spots; belly white, towards the front spotted with dusky brown.

7. Dr. C. Th. Siebold on the female generative organs of the *Tachinæ*. From observations made on the following species which occur in the neighbourhood of Dantzic, 1. *T. fera*; 2. *T. tessellata*; 3. *T. grossa*; 4. *T. hæmorrhoidalis*; 5. *T. vulpina*; 6. *T. nov. spec.*; 8. *T. flavescens*; 9. *T. flavescens*? 10. *T. larvarum*; 11. *T. larvarum*? 12. *T. tristis*;—it appears that the female generative organs of the *Tachinæ* are not organized after a common type, but present very remarkable differences of structure; those from No. 1 to 7 bringing forth living maggots. The vagina is the part subjected to the greatest change in the various species, its peculiar forms at times curiously characterizing the female generative organs of certain *Tachinæ*. In this respect they may be properly divided into two groups: in the first is enumerated all those having a long vagina, while the second group contains those possessing a sac-like vagina. I. *Group*. The eggs collect in immense quantities in the long vagina of this group, and here are developed into maggots, which leave their egg-shell before they are deposited by the female. The development of the eggs takes place only in the vagina, therefore after they have slid by the mouth of the seminal capsules, which are situated at the posterior end of the vagina. Those eggs, quite perfectly formed, which were met with above the mouth of the seminal capsules in the ovaries or oviducts, never exhibited any incipient development of the maggot. The number of eggs which the vagina contains is immense. "As I had taken the pains," says Dr. Siebold, "to count the brood in *T. tessellata*, which I found in the vagina, and brought out by an exact enumeration 2386 maggots and eggs, I could not bring myself to enumerate those which were housed in the vagina of *T. fera*, as I was convinced on a general view that I should have to count a brood three times greater than in *T. tessellata*. When therefore Reaumur, in his 'Mémoires pour servir à l'Histoire des Insectes,' t. iv. p. 417, calculated the almost incredible number of 20,000 larvæ in the vagina of a female *Tachina*, this in the end might not be much overrated." II. *Group*. The female *Tachinæ* of this group produce fewer eggs than those belonging to the first. "I discovered in their short wide sheath generally but one large egg, in which the development of the

maggot had never commenced, so that, at least up to the present time, I have observed none of the species of this group to be viviparous. It is curious how the seminal fluid and the Spermatozoa contained in it can arrive in the seminal capsules, situated so far from the vulva; in the first group of the *Tachinæ*, ciliatory motion cannot advance the semina from the anterior commencement of the sheath to its very end, since the sheath and the other female generative organs do not possess any, and indeed I have hitherto not discovered any ciliatory organs in true insects."

8. On the genus *Scarabus*, Montf., by F. H. Troschel.

9. On some native (German) land snails, by Dr. Aug. Muller. The author notices the occurrence of *Helix Scarburgensis* near Kiel, on the coast of the Baltic, and points out the impropriety of giving names of places to new species. The other species mentioned are *Vertigo plicata* and *V. pusilla.*

On vegetable Spermatozoa, by J. Meyen. The author directs the attention to the existence of the long-tailed Spermatozoa in the anthers of *Marchantia polymorpha.*

The first part of a paper on the Motions of Plants (a prize memoir), by M. Dassen ; this we shall notice with the third part. And a translation of Mr. Owen's paper on *Gnathostoma* finishes the present number.

Works in the Press.

Natural History and Illustrations of the Scottish Salmonidæ. By Sir William Jardine, Bart.

It is proposed, under the above title, to publish a series of plates illustrating the different species of the Scottish fishes, which compose this family, accompanied with a volume of descriptive letterpress.

The plates will amount to from *twenty-five* to *thirty* in number, elephant folio, so as to admit of the greater part being represented of the size of life. On these will be figured all the species of migratory salmon and of trout, with its varieties, which inhabit or frequent the rivers and lochs of Scotland, together with the char, coregoni, &c. The very dissimilar appearance which this group of fishes assumes at different ages and at different seasons, has rendered their history extremely difficult to investigate, and has in many instances caused a nominal multiplication of species by several being described in states apparently very different, while the variation was occasioned by the same influence which acts at similar periods on the plumage of birds, and to which may be attributed the great confusion so long

existing, and in some degree still continuing, in our knowledge of this higher class of living beings.

Scotland being almost in every part an alpine country, and abounding in large rivers and innumerable mountain streams, with lochs in an equal proportion and variety, affords an ample field for the illustration of this group. This great characteristic mark of its fresh-waters, and opportunities having occurred here more frequently for the examination of the various species, and their habits, than in the other parts of Great Britain or Ireland, induces the author to restrict the work, and give the illustration of this range of country complete in itself. At the same time, with a few exceptions, all the British species will be represented; and it is proposed, if a moderate success attend the publication of this work, that two additional Fasciculi shall be devoted to the illustration of those species and varieties of England and Ireland, which do not occur in the sister kingdom.

The illustrations will be published in Fasciculi of six plates each. The first will be ready for delivery to Subscribers in November, and will contain figures of, 1. *S. Salar, young or Gilse*; 2. *Do. do.* variety; 3. *S. albus* of Fleming, or Herling of the Solway; 4. *S. ferox*; 5. *S. fario,* lacustrine varieties; 6. *Coregonus Willughbii* or Lochmaben coregonus. The volume of descriptive letter-press will be printed in an octavo size, and will be published on the completion of the illustrations. In this will be detailed, as far as possible, the natural history of the family, and it will be accompanied with numerous plates and wood-cuts, illustrating the parts connected with the external characters, scaling, structure, food, parasites, &c.

Information is earnestly requested on any subject connected with the above work, to be addressed to Jardine Hall, by Lockerbie, Dumfriesshire.

Intended to be published by Subscription, in One Volume, demy 8vo, *Monographia Anoplurorum Britanniæ; or an Essay on the British Species of Parasitic Insects belonging to the order Anoplura of Leach.* By Henry Denny, Esq.

The object of the present Monograph is to combine in one volume highly magnified figures and descriptions of all the species of parasitic insects belonging to the families *Pediculidæ* and *Nirmidæ*, found in Great Britain, "many of the individuals of which being the companions and consequence of poverty and filth, are regarded in general rather as objects of disgust than of attraction: from this cause and perhaps too from their minuteness, these insects have hitherto excited less attention amongst naturalists than their singular

and beautiful forms and structure deserve." The importance, however, of illustrating this tribe will be evident when it is stated that almost every species of quadruped and bird has its peculiar parasite, and many of them are infested by two, three, or even five distinct species—that these offer so great a diversity of colour, form, and habits, that none but an entomologist would recognise the family to which they belong from any analogy they bear to the more familiar examples. Notwithstanding the number of individuals continually offering themselves to the observer of nature, it is no less strange than true there is no one book to which he can refer for the purpose of naming them. It must not, however, be inferred from this that the subject has been wholly neglected by men of science, for so early as 1688 forty species were figured and described by Redi, since which we find the illustrious names of Linnæus, Geoffroy, De Geer, Scopoli, Schranke, Fabricius, Albin, Latreille, Hermann, Olfers, Lyonet, Panzer, Leach, Nitzsch, and Children, assisting to elucidate this group. But as the labours of many of these naturalists are difficult to come at, and several when procured give little more than a catalogue of names, without figures or reference to description, few can avail themselves of the benefit they offer. The work will form a concise concentration of the information already possessed, with original figures, drawn and coloured after nature, and will undoubtedly be a valuable addition to the entomological literature of this country.

Mr. Denny will feel greatly obliged by the transmission of examples of the different species of *Pediculidæ* and *Nirmidæ* from the following quadrupeds and birds :—

Fox. Otter. Polecat. Weasel. Squirrel. Hedgehog. Mouse. Rat. Shrews. Mole. Dormouse. Guinea Pig. Hare. Seal. Wild Cat. Bats. Pine Martin. Goat.

Kite. Goshawk. Kestril. Eagle. Owl. Little Owl. Roller. Nutcracker. Creeper. Wren. Long-tailed Titmouse. Goldfinch. Pine Grossbeak. Redstart. Redbreast. Ringouzel. Dipper. Pratincole. Bittern. Crane. Night Heron. Ibis. Bustard. Little Bustard. Northern Diver. Black Stork. Quail. Hawfinch.

PROCEEDINGS OF LEARNED SOCIETIES.

BOTANICAL SOCIETY OF EDINBURGH.

April 12th, 1838.—Robert Maughan, Esq., Member of the Wernerian Society, in the Chair.

Mr. Forbes read a paper on the specific claims of *Primula acaulis,*

veris, and *elatior*, in which he contended that instead of three, these form but two species, viz. *P. acaulis* and *veris*; and that *P. elatior* is not only not a hybrid, but a *non-existence*, inasmuch as after particular investigation he had not been able to find any plant at all agreeing with the characters of *P. elatior* as given by Jacquin, who was the founder of the species.

Professor Christison presented some observations on the preservation of fruits and other botanical specimens in the moist state, and remarked that after numerous experiments made for a series of years with various fluids, he had found none which served so well to preserve both the consistence and colour of fruits, leaves and flowers, as a concentrated solution of common salt. Numerous specimens were exhibited which had been preserved in this way for one, two, three, and five years, among which were sprigs with leaves and ripe and unripe fruit of *Myristica moschata, Xanthochymus pictorius, Garcinia Cambogia, G. Mangostana, Hebradendron cambogioides, Alpinia Cardamomum, Mangifera indica, Ricinus communis, Flacourtia inermis*, &c. In the greater part of these the green tint of the leaves and the peculiar colour of the fruit seemed to have undergone little alteration. When the fruit however is very pulpy, as in *Solanum Lycopersicum*, or lemons and oranges, a solution of salt is comparatively inapplicable, because the fruit shrivels by exosmosis of its fluids, and diluted pyroligneous acetic acid is found to be preferable.

Mr. Hamilton read a paper on the Gardens of the Ancient Hebrews, treating in succession, 1st. Of grounds for the cultivation of the vine, the olive, or any single species of fruit tree; 2nd. Of orchards for rearing fruit trees in general; 3rd. Of kitchen gardens; 4th. Of flower gardens. The paper concluded with assigning the reasons on account of which gardens were excluded from the walled cities of Judah, and with mentioning certain restrictions on the horticultural taste and skill of the people, occasioned by the interference of their Doctors and Rabbis.

May 10th.—Professor Graham, President, in the Chair.

Mr. Macaulay read the first part of a paper "On the effects of Vegetation on the Atmosphere," in which the influence of the vegetable kingdom on the *composition* of the atmosphere was treated. After detailing various experiments tending to show that different natural families may differ in their effects on the atmosphere, and giving an abstract of the researches of Priestley, Senebier, Berthollet, Ellis, Saussure, Burnet, Morren, Daubeny, and others, Mr. Macaulay concluded by presenting a series of propositions which appeared to him to contain the present state of our knowledge on this subject.

Dr. Graham read a description of *Catasetum discolor*, var. *luteo-aurantiacum*, and offered some general observations on the genus *Catasetum*.

June 14.—Dr. Balfour, V.P., in the Chair.

The Secretary stated that a letter had been received by the President from William Gibson Craig, Esq., M.P. inclosing a communication from Lord John Russell, intimating that Her Majesty had been graciously pleased to become Patron of the Botanical Society.

Dr. Balfour then read a paper by Wm. B. Carpenter, Esq. of Bristol, containing a general view of the function of reproduction in vegetables, in which Mr. Carpenter endeavoured to show that the reproductive system can be traced with increasing complexity, but without alteration in its essential characters, from the lowest Cryptogamic Tribe up to the most perfectly organized flowering plants.

July 12th.—Professor Graham, President, in the Chair.

It was stated by the Secretary that the Society had received an increase of 77 Members since the date of the last Annual Report in 1837, and that the total number of Members now amounted to 199, in the following proportions.

British Honorary Members .	6	Non-Resident Members	63
Foreign Honorary Members	20	Foreign Members	27
Resident Members	82	Associate	1—199

Mr. Falconer read an account of a Botanical excursion to one of the islands of Hyères by Mr. Percy in the year 1836, with a list of most of the species observed.

Mr. Macaulay read some observations on several of the species of the genus *Tortula*, communicated by Mr. Robert Stark of Cirencester.

Mr. Brand read a paper containing his views on the proper mode of arranging the Society's Herbarium and forming a catalogue for reference. He proposed to divide Great Britain and Ireland, including the adjacent islands, into 42 districts, grouped according to a union of their political and natural boundaries, and he exhibited a map of the country arranged on this principle. He proposed to devote a page of the catalogue to each species, and to have printed on it the numbers and names of all the districts, with columns annexed for recording the following particulars, namely, the latitude and longitude of the centre of each district, and the county whence the specimens are obtained; the condition of the plants in the respective districts, as denoted by the marks or signs used in the Society's published catalogue; the relative situation or habitat of the specimens furnished, as whether upland, inland or from the coast; the

nature of the soil or rocks where the plants were found; the time of their first coming into flower; with a space for general observations. The principles and objects of Mr. Brand's scheme and arrangement seemed to be generally approved of, and it was referred to a Committee to consider it more fully, and to report to the Meeting in November.

The Society then adjourned till Thursday the 8th of November.

ZOOLOGICAL SOCIETY.

January 9th, 1838.—Thomas Bell, Esq., in the Chair.

Mr. Gray exhibited a new species of *Perameles*, in size and general appearance very closely agreeing with *Per. nasutus*, but peculiar for its very short white tail, and in having several indistinct broad white bands over the haunches. The species inhabits Van Diemen's Land, where it frequents gardens, and commits great havoc amongst bulbous roots, which it is said to devour with avidity. Mr. Gray proposed for it the name of *Per. Gunnii*, after its discoverer, Mr. Ronald Gunn *.

It was suggested in the course of some discussion which followed Mr. Gray's observations, that the roots upon which this species was supposed to feed, were probably attacked for the purpose of procuring such insects as might be found in them; and Mr. Owen in reference to this point alluded to a dissection of a *Perameles* made by Dr. Grant, and published in the Wernerian Transactions, in which insects were found to constitute almost the sole contents of the stomach and intestines.

A very large and beautiful Antelope, of a species hitherto entirely unknown, and which had just arrived in England under the care of Captain Alexander from the Cape, was in the room for exhibition; and the history of the circumstances under which it had been discovered, were detailed in the following letter, addressed to the Secretary, by Capt. W. C. Harris, of the Bombay Engineers.

Cape Town, South Africa, Oct. 10, 1837.

Sir,—I beg the favour of your presenting to the Zoological Society the accompanying drawing and description of an entirely new and very interesting species of Antelope, which I discovered in the course of an expedition to the interior of Africa, from which I have lately returned. A perfect specimen that I brought down has been admirably set up by Monsieur Verreaux, the French naturalist at Cape Town, and will be sent to London in the course of a few days,

* Since described in the Annals of Natural History, for April, 1838.

to the care of Dr. Andrew Smith. It would appear to belong to the sub-genus *Aigocerus*, and in form, as well as in other respects, bears remote resemblance to the *Aigocerus Equina*, (Roan Antelope or Bastard Gemsbok,) with which it has been confounded by many persons imperfectly acquainted with the subject to whom it has been exhibited. A comparison of the two animals will, however, render the existing difference between them too obvious to demand any observation from me.

During nearly three months that I hunted over the country lying between the 24th and 26th parallels of south latitude, within 28° and 30° east longitude, I only once met with the Antelope in question. On the northern side of the Cashan range of mountains, about a degree and a half south of the tropic of Capricorn, I found a herd, consisting of nine does and two bucks, and followed them until I captured the specimen from which the enclosed drawing was made.

None of the natives of the country were familiar with the appearance of the animal when first interrogated on the subject, although after conferring amongst themselves, they agreed that it was Kōō-kāme, (*Oryx Capensis,*) the Gemsbok; and, of the many individuals to whom it has been shown, a trader named Robert Scoon is the only one by whom it has been recognized. He declares that he saw a herd of them some years ago near the very spot I have described, but could not succeed in killing one. It is, doubtless, very rare; and, judging from the formation of the foot, entirely confined to the mountains.

The females are somewhat smaller than the males, are provided with shorter and slighter, but similarly shaped horns, and are similarly marked; a deep chestnut brown, verging upon black, taking the place of the glossy black coat of the male. I did not obtain a female specimen; but whilst riding down the buck, I had abundant opportunities of narrowly observing them within the distance of a few yards, and am, therefore, positive as to the correctness of the description here given.

I have for the present designated the new Antelope "*Aigocerus niger*;" but of course it will rest with the Zoological Society either to confirm that name, or to bestow one more appropriate or more scientific; and I shall be gratified by their doing so.

I have the honour to be, sir,

Your most obedient servant,

W. C. Harris.

The following description of this interesting addition to the *Fauna* of Southern Africa was appended to the above letter.

Aigocerus niger. THE SABLE ANTELOPE.

Adult male four feet six inches high at the shoulder; nearly nine feet in extreme length. Horns thirty-seven inches over the curve, placed immediately above the eyes, rather higher than occurs in the *Aigocerus Equina*; flat, slender, sub-erect, and then strongly bent back similar-wise *; at first gradually diverging, and then running parallel to each other; three-fourths annulated with about thirty strongly pronounced, incomplete rings, more rigid on the edges, but chiefly broken on the outside of the horn; the remaining one fourth smooth, round, slender and pointed. Head somewhat attenuated towards the muzzle, and compressed laterally. Carcase robust. Withers elevated. Neck broad and flat. Hoofs black, obtuse, and rather short. Hair close and smooth: general colour of the coat intense glossy black, with an occasional cast of deep chestnut. A dirty white streak commencing above each eye, continued by a pencil of long hairs covering the place of the suborbital pouch, (of which cavity no trace is to be found in this Antelope,) and then running down the side of the nose to the muzzle, which is entirely white; the same colour pervading one half of the cheek, the chin and the throat. Ears ten inches long, narrow, tapering and pointed; white within, lively chestnut without, with black pencilled tips. A broad half crescent of deep chestnut at the base of each ear, behind. A small, entire black muzzle. A copious standing black mane, five and a half inches high, somewhat inclined forwards, and extending from between the ears to the middle of the back. Hair of the throat and neck longer than that of the body. Belly, buttocks, and inside of thighs, pure white. A longitudinal dusky white stripe behind each arm. Fore legs jet black inside and out, with a tinge of chestnut on and below the knees. Hind legs black, with a lively chestnut patch on and below the hocks. Tail black; long hair skirting the posterior edge, and terminating in a tuft which extends below the hocks. Sheath tipped with black.

Female smaller than the male, with smaller, but similarly shaped horns. Colour, deep chestnut brown verging upon black.

Very rare. Gregarious, in small families. Inhabits the great mountain range which threads the more eastern parts of Moselekatse's territory.

* *Scimitar*-wise?

DIMENSIONS.

	Inches.		Inches.
Height at shoulder	54	Breadth of neck	16
Length of body	44	Breadth of fore-arm	6
Length of neck	17	Breadth of thigh	6
Length of head	19	Breadth of fore-leg	$2\frac{1}{2}$
Length of tail	25	Breadth of hind-leg	3
Length of hind-quarter	19	Length of horns	37
Depth of chest	30	Breadth asunder at base	1
Length of fore-arm	16	Breadth asunder at tips	$9\frac{1}{2}$
Fore knee to foot	15	Length of ears	10
Croup to hock	36	Breadth of head	9
Hock to foot	$18\frac{1}{2}$		

A specimen of a marine snake (*Pelamys bicolor*) presented to the Museum by the Rev. William White, Wesleyan Missionary to the New Zealand Association, and which, with several others, had been picked up dead upon the beach on the west coast of that country, was upon the table; also another portion of the birds collected by Charles Darwin, Esq., to which Mr. Gould in continuation drew the attention of the Members.

January 23.—Richard Owen, Esq., in the Chair.

A selection of the *Mammalia* procured by Captain Alexander during his recent journey into the country of the Damaras, on the South West Coast of Africa, was exhibited, and Mr. Ogilby directed the attention of the Society to the new and rare species which it contained.

Among the former were the *Herpestes melanurus* and *Cynictis Ogilbii* of Dr. Smith, the *Canis megalotis*, &c. The latter consisted of five new species, which Mr. Ogilby characterized as follows:

Macroscelides Alexandri. Fur long and fine, very dark blue-black at the root, but pointed with pale sandy-red above, and white beneath; ears pretty large, subelliptical, and red behind; whole under lip red; *tarsi* white; tail long, hairy, and very much attenuated: length $5\frac{3}{4}$ inches; tail $4\frac{3}{4}$ inches.

Macroscelides melanotis. Of a rather larger size than the former, with large head, dark brown or black ears, rather sandy under ip, dunnish white throat and *abdomen*, but pale reddish brown chest; colour of the upper parts much the same, but rather more ashy; *tarsi* light brown; tail mutilated: length 6 inches.

Chrysochloris Damarensis. Brown, with a silvery lustre both above and below; a yellowish white semicircle extends from eye to eye, under the chin, covering the whole of the cheeks, lips and lower jaw; a very marked character which, as well as the peculiar shade of the

colour, readily distinguishes it from the new species described by Dr. Smith: no tail: length $4\frac{1}{2}$ inches.

Bathyergus Damarensis. A species intermediate in size between *Capensis* and *Hottentotus*: colour uniform reddish brown both above and below, with a large irregularly square white mark on the *occiput*, much larger than in *Hottentotus*, and another on each side of the neck just under the ears; these two meet on the throat, which is thus covered with dirty dunnish white; tail, a large flat stump covered with coarse reddish brown bristles, which stand out from it in all directions like *radii*; paws reddish brown: length $8\frac{1}{4}$ inches; tail $\frac{1}{2}$ inch*.

Graphiurus elegans. Smaller than *Graph. Capensis* of Cuv., and of a purer and deeper ash colour above; the chin, throat, and cheeks are covered by a large patch of pure white, the rest of the under surface is mixed grey and ash, and all the *tarsi* and paws pure white: there is a mark of the same colour above and in front of each ear, and an oblique white stripe runs from the throat backwards over the shoulder, just in front of the arms; an intense black stripe passes from the commissure of the mouth, through the eye to the ear; the tail is covered with short coarse hair, pure white above, pure black below, and pencilled or shaded on each side; face greyish ash; whiskers abundant, and of a grey colour: length 5 inches; tail $2\frac{3}{8}$ inches.

Mr. Ogilby observed, that the above species, and the one described by F. Cuvier, under the name of *Graph. Capensis*, appeared to him to differ in no respect from the genus *Myoxus*, and that in characterising the present animal, he merely made use of the name *Graphiurus* to indicate its relation to that originally described by Cuvier.

Mr. Ogilby likewise called the attention of the Society to certain peculiarities in the structure of the hand, in a living specimen of a new species of *Galago*, which he proposes to call *Otolicnus Garnettii*, after the gentleman to whom he was indebted for the opportunity of describing it, and who has already conferred many advantages upon science by the introduction of numerous rare and new animals. The peculiarity of structure to which Mr. Ogilby alluded, consisted in the partially opposable character of the index finger of the fore hands, the fingers on these members being divided into two groups, composed of the thumb and index on one side, and the remaining three fingers on the other, as in the Koalas and Pseudocheirs. He re-

* This specimen, and the *Macroscelides melanotis*, were purchased for the British Museum, and the remaining three species for the Museum of the Zoological Society at the sale of Capt. Alexander's Collection, March 8, 1838.

marked that the anterior index in all the inferior *Lemuridæ* was weak and powerless, and that it had the same tendency to divide with the thumb instead of the other fingers in the rest of the Galagos, as well as in the *Nycticebi, Microcebi, Cheirogalei,* and *Tarsii,* whilst in the Potto it was reduced almost to a tubercle. These genera consequently formed a little group analogous to the Koalas and Pseudocheirs among the *Didelphidæ,* being, exclusive of these animals, the only Cheiropeds in which this character occurs; and Mr. Ogilby regarded the fact as a strong confirmation of the truth of the relations which he had formerly pointed out as subsisting between these two families. The *Otolicnus Garnettii* is of a uniform dark brown colour on every part both above and below; the ears large, black, and rather rounded; the tail long, cylindrical and woolly; and the size of the animal about that of a small *lemur,* or considerably larger than *Oto. Senegalensis.*

A communication was then read to the Meeting by Prof. Owen, entitled, "Notes on the Anatomy of the Nubian Giraffe."

These notes contain the general results of the anatomical examination of three specimens of the Giraffe, which Mr. Owen had been so fortunate as to have the opportunity of dissecting; one of the three (a male) died in the Society's Menagerie, and the remaining two (male and female) were in the possession of Mr. Cross of the Surrey Zoological Gardens.

The author agrees with Cuvier in considering that the external characters of the Giraffe clearly indicate its position in the order *Ruminantia,* to be between the genera *Cervus* and *Antilope*; the true bony material of its horns. which are covered by a *periosteum* defended by hairy integument, resembling the growing antlers of the Deer; but the non-deciduous character of this tegumentary covering to the *periosteum,* and the consequent permanency of the horns in the Giraffe, reminding us of the persistent nature of these organs as it obtains throughout the Antelopes.

The black callous integument on the upper surface in the horns, is noticed as a probable indication of a tendency to develope a superabundance of epidermic material; and Mr. Owen conceives that the strong black hair which grows in a matted tuft around their extremities may represent, in an unravelled state, the fibres composing the horny coverings of the core in the horns of the Antelope. A few examples occur among both Deer and Antelopes, in which the possession of horns is found in the two sexes, as in the Giraffe; but in this animal these organs present certain peculiar characters in the mode of their articulation to the skull, the basis of the horn

being united by *sychondrosis* to the frontal and parietal bones, constituting an *epiphysis* rather than an *apophysis* of the *cranium*. With regard to the supposed occurrence of a third horn in the male Nubian Giraffe, as the osteological details bearing upon this point are given in that part of the memoir which embraces the description of the skeleton, Mr. Owen in this place merely observes, that the evidence afforded by the examination of the two individuals in question was rather opposed to, than in favour of its existence.

The general form of the Giraffe is obviously modified with especial reference to its exigencies and habits; the prolongation and extensibility of its hair-clad muzzle, the peculiar development, cylindrical shape and flexibility of its tongue; the oblique and narrow apertures of the nostrils, defended by hair and surrounded with cutaneous muscular fibres, enabling the animal to close them at will, and thus to protect the olfactory cavity from the fine particles of sand which in the storms of the desert would otherwise find ingress, are points referred to by the author as exhibiting marked adaptations of structure in especial harmony with a mode of life consequent upon the nature of its food and its geographical distribution.

For a description of the general external peculiarities of the body the author refers to Rüppell's Reise im Nordlichen Africa; Geoffroy in the Annales des Sciences, xi. p. 210; Salze, in the Mémoires du Museum, xiv. p. 68; and the 5th and 6th volumes of Sir E. Home's Comparative Anatomy.

The bulk of the paper consists of anatomical details relative to the organs of digestion, the sanguiferous system, the nervous system, the muscles, and the male and female organs of generation of the Giraffe, for which we must refer to the original abstract contained in No. 61 of the Society's "Proceedings." We extract, however, the following particulars belonging strictly to the *comparative* anatomy and to the zoological relations of this animal.

The Giraffe differs from every other Ruminant in the form of the mouth, which resembles that of the Elk in the non-division and extensibility of the hair-clad upper lip, but differs widely from it in the elegant tapering shape of the muzzle. The muscles of the tongue, both as to number and arrangement, presented no peculiarities of importance, but the nerves were characterized by the beautiful wavy course in which they were disposed, and by which disposition they are accommodated to the greatly varying length of this organ. The erectile tissue, conjectured by Sir Everard Home to be present in the tongue of the Giraffe, and to be the cause of its extension, has no existence: the only modifications of the vas-

cular system worthy of notice were the large size and slight plexiform arrangement of the lingual veins at the under part of the base of the tongue. The inner surface of the lips, especially where they join to form the angles of the mouth, was beset with numerous close-set, strong, retroverted and pointed *papillæ*, similar to those distributed over the interior of the gullet in the *Cheloniæ;* a structure which is also present in other Ruminants.

The palate was beset with about sixteen irregular transverse ridges, having a free denticulate edge directed backwards; an apparatus for detaining the food, and ensuring its deglutition, which Mr. Owen notices as especially required in the Giraffe, by reason of the small comparative size of its head and jaws: he also refers to the mechanical obstacles, which oppose the escape of the food when regurgitated, in the *Ruminantia* generally, as the presence of buccal *papillæ*, &c. as an evidence on which to found an argument of special adaptation or design. This structure is noticed by Cuvier, but considered by him as only coexistent with the occurrence of *papillæ* upon the lining membrane of the stomach, and as a condition of parts which furnishes no obvious indication of any connexion with final causes; with a view of showing that no such relation of coexistence as that imagined by Cuvier, in the presence of *papillæ* upon different portions of the alimentary canal, can be positively established, Mr. Owen instances the Turtle, which has these callous bodies in great abundance, but entirely restricted to the lining membrane of the *œsophagus*, in which situation their use is sufficiently apparent. The great *omentum*, in the female, was studded reticularly with fat, as in the Ruminants generally. In the male, on raising the paunch, the spiral coils of the *colon* (characteristic of the Ruminants) came into view, together with the rest of the *jejunum* and *ilium*, upon the removal of which the third and fourth stomachs, and the small liver wholly confined to the right of the mesial plane, were exposed. The spleen, as usual in the *Ruminantia*, had its concave surface applied to the left side of the first stomach or *rumen*.

The kidneys occupied the usual position in the loins, the right one a little more advanced than the left; their figure was rounded and compact, as in the Deer and Antelopes, and they were not externally lobated as in the Ox.

The cells of the *reticulum*, as in the Reindeer, were extremely shallow, their boundaries appearing only as raised lines; but there was the same form and grouping of the cells as obtains throughout the Ruminants generally, the arrangement being that by which the greatest number are included in the least possible space.

The folds of the *psalterium* resembled those of most other Ruminants.

The *cæcum* was a simple cylindrical gut, as in other Ruminants; its circumference about six inches. The disposition of the *colon* resembled that of the Deer.

The presence of a gall-bladder, distinguishing the hollow-horned from the solid-horned Ruminants, made the investigation of this point in the anatomy of the Giraffe one of extreme interest; and Mr. Owen remarks, that the result of his examination of three individuals shows the caution which should be exercised in generalizing upon the facts of a single dissection.

In the first Giraffe (Mr. Cross's female) a large gall-bladder was present, having the ordinary position and attachments, but presenting the unusual structure of a bifid *fundus*. Upon making a longitudinal incision down its side, it was found to be divided throughout its length by a vertical *septum* of double mucous membrane, forming two reservoirs of equal size; the organ in fact was double, each bladder having a smooth lining membrane, and communicating separately with the commencement of a single cystic duct.

In the two Giraffes subsequently dissected not a vestige of this organ could be detected, the bile in them being conveyed by a rather wide hepatic duct to the *duodenum*. Mr. Owen therefore concludes that the absence of the gall-bladder is the normal condition, and that the Giraffe in this respect has a nearer affinity to the Deer than to the Antelopes.

The cranial *plexus* of the internal carotid artery was much less developed than in the ordinary grazing Ruminants.

The brain of the Giraffe closely resembled, in its general form, and in the number, disposition, and depth of the convolutions, that of the Deer: it was more depressed than in the Ox, and the *cerebrum* was wholly anterior to the *cerebellum*. The anterior contour of the cerebral hemispheres was somewhat truncated.

The olfactory nerves were large, as in most *Ruminantia*, and terminated in expanded bulbs, in length $1\frac{1}{2}$ inch, in breadth 1 inch: these were lodged in special compartments of the cranial cavity. The optic nerves and ninth pair were relatively larger than in the Deer. The other cerebral nerves presented no peculiarity.

The spinal chord had a close investment of *dura mater*, and was remarkable for the great length of its cervical portion, which, in the Giraffe dissected at the Zoological Gardens, measured upwards of three feet, the entire length of the animal from the muzzle to the vent being eight feet. Mr. Owen here particularly describes the appearance in the origins of the cervical nerves depending upon the

elongation of this part of the spinal chord; the space between the lower filaments forming the root of one nerve, and the upper filaments of the root of the succeeding nerve was not more than the space between the individual filaments of each root; whence it would seem that the elongation of the cervical portion of the chord was produced by a general and uniform interstitial deposition during fœtal developement, which thus effected an equable separation of these filaments; so that a single nerve, as in the case of the third cervical, might derive its origin from a space extending six inches in length.

In the dissection of the abdominal muscles no peculiarity of importance was noticed; but in the neck there existed a highly interesting modification of the parts which effect the retraction of the *os hyoides*. The pair of muscles which, as in some other Ruminants, combines the offices of *sterno-thyroideus* and *sterno-hyoideus*, arose in the Giraffe by a single long and slender carneous portion from the anterior extremity of the *sternum*; this fleshy origin was nine inches long, and it terminated in a single round tendon six inches in length; the tendon then divided into the two muscles, each division becoming fleshy, and so continuing for about 16 or 18 inches; then each muscle again became tendinous for the extent of two inches, and ultimately carneous again, prior to being inserted in the side of the thyroid cartilage, and continued thence in the form of a *fascia* into the *os hyoides*.

Mr. Owen observes that this alternation of a non-contractile with a contractile tissue, as exhibited by the above structure, displays in a most striking manner the use of tendon in regulating the amount of muscular contraction. Had the *sterno-thyroideus* been muscular throughout its entire length, the contraction of its fibres would have been equal to draw down the *larynx* and *os hyoides* to an extent quite incompatible with the connections of the adjacent parts; but the intervention of long and slender tendons duly apportions the quantity of contractile fibre to the extent of motion required.

The *ligamentum nuchæ* was remarkable for its prodigious developement; it commenced at the sacral *vertebræ*, and receiving, as it advanced, accessions from each of the lumbar and dorsal *vertebræ*, became inserted into the spinous processes of the cervical, the extreme portion passing freely over the *atlas*, and terminating by an expanded insertion upon the occipital crest. The bony attachment of the ligament afforded by the skull was raised considerably above the roof of the cranial cavity, the exterior table of the skull being widely separated from the vitreous plate by large sinuses, which commencing above the middle of the nasal cavity extended as far posteriorly as beneath the base of the horns; the sinuses were traversed by strong

bony *septa,* forming a support to the exterior table. The sphenoidal sinuses were of large size.

The nasal cavity occupied the two anterior thirds of the skull, and the *ossa spongiosa* were proportionably developed.

The condyles of the *occiput* were remarkable for their great extent in the vertical direction, and the inferior and posterior parts of the articular surface meet at an acute angle; a structure which enables the Giraffe to elevate the head into a line with the neck, and even to incline it slightly backwards.

Four longitudinal rows of flattened processes projected from the inner surface of the *uterus,* showing that the *fœtus* is developed in the Giraffe by means of a cotyledonous subdivided *placenta,* as in other horned Ruminants, and not, as in the Camel, by an uniform vascular villosity of the *chorion.*

February 13th, 1838.—William Yarrell, Esq., in the Chair.

Mr. Martin exhibited an insectivorous animal which had fallen under his observation in examining a collection of specimens, presented some time since to the Museum, by the late William Telfair, Esq.

In the Zoological Proceedings for March 12th and July 9th, 1833, reference is made to a letter of Mr. Telfair's, accompanying a very young insectivorous animal, known to the natives of Madagascar by the name "Sokinah," and which Mr. Telfair was disposed to refer to the genus *Centenes.* The above specimen being only seventeen days old, its characters could not be satisfactorily determined; but the present animal, which Mr. Martin considers to be the adult of the same species, appears to be more nearly related to the genus *Erinaceus* than *Centenes*; but at the same time it differs so materially in the character of its dentition, as to warrant the establishment of a new genus for its reception. Mr. Martin therefore proposed to characterize it under the generic appellation of *Echinops,* with the specific title of *E. Telfairi,* in memory of the lamented and zealous Corresponding Member of the Society from whom it had been received.

ECHINOPS.

Corpus supernè spinis densis obtectum.

Rostrum breviusculum.

Rhinarium, aures, caudaque ut in *Erinaceo.*

Dentes primores $\frac{4}{2}$, superiorum duobus intermediis longissimis, discretis, cylindraceis, antrorsùm versis; proximis minoribus.

Canini $\frac{1-1}{0-0}$.

Molares $\frac{5-5}{7-7}$; utrinsecùs antico 1mo suprà, et 3^{bus} infrà spuriis; reliquis, ultimo suprà excepto, tricuspidatis, angustis, transversìm

positis; ultimo suprà angustissimo; molaribus infrà inter se ferè æqualibus, ultimo minore.

Pedes 5-dactyli, ambulatorii; halluce breviore; unguibus parvulis, compressis; plantis denudatis.

Echinops Telfairi. *Ech. auribus mediocribus, subrotundatis intùs atque extùs pilis parvulis albidis obsitis; capite supernè pilis fuscis; buccis, mystacibus corporeque subtùs sordidè albis, spinis fuscescenti-albis ad basin, apicibus castaneis; caudâ vix apparente.*

	unc.	lin.
Longitudo *corporis* totius	5	2
——— ab apice rostri ad auris basin	1	2
——— *tarsi, digitorumque*	,,	$10\frac{3}{4}$
——— *auris*	,,	5

Habitat. Madagascar?

"*Sokinah*" of the Natives of Madagascar?

In the *upper jaw* the incisors are four in number, and apart; the two middle are large, sub-cylindrical, elongated, and placed at the apex of the jaw; the two others are small, and seated behind the former. Separated from these by a small space, succeed the canines, similar in character to the incisors, but stouter and with a slight posterior notch. The molars are five on each side: the first false and simple; the three next transversely elongated, with two external tubercles in contact, and one internal; hence their crowns assume the form of an elongated triangle, the apex being internal; the fifth molar is a slender *lamina* transversely placed, but not advancing so far laterally as the molar preceding it.

The *under jaw* presents two small incisors, somewhat apart from each other, and directed obliquely forwards; behind these there follow on each side in succession three larger and conical teeth, directed obliquely forwards, and which may be regarded as *false molars.* Separated from the last of these by a small space, succeed four molars on each side, vertical and smaller than those above, with two tubercles internally and one externally, so that the worn surface is triangular, with the apex outwards; the last is the smallest: the surfaces of all are apart, but their bases are in contact.

Mr. Martin observes, that this system of dentition (very distinct from that which characterizes the Tenrecs, (*Centenes,*) and the genus *Ericulus* of Isidore Geoffroy) presents us with characters which decidedly separate *Echinops* from *Erinaceus,* notwithstanding their approximation. In *Erinaceus* the upper incisors are six; there are no canines, but three false molars on each side, and four true molars, of which the last is small and narrow; the others square, with two outer and two inner tubercles; while in the lower jaw, the incisors,

two in number, are very large, followed on each side by two false molars, and four true molars. In *Echinops*, as in *Erinaceus*, the feet have five toes; the thumb of the fore-feet is small and seated on the wrist, the other toes are small, and armed with feeble, compressed, hooked claws, the last toe the smallest: the toes of the hind-feet resemble those of the fore-feet, and the inner and outer are the smallest. The snout, ears, tail, and spiny covering of the upper surface of the body, as in *Erinaceus*.

The skull, as compared with that of *Erinaceus*, was proportionally very inferior in size; it was more level above, and narrower, the cranial cavity being contracted, and the muzzle shorter. The occipito-parietal ridge was elevated, the zygomatic arches were almost obsolete. The palate was narrow, and the posterior *foramina*, which in the hedgehog are large open fissures, were reduced to minute orifices. The *pelvis* was very narrow, and the pubic bones were separate in front.

The vertebral *formula* was as follows:

Cervical	7
Dorsal	15
Lumbar	7
Sacral	2
Coccygeal	8?

The ribs consisted on each side of 8 true and 7 false.

Mr. Yarrell exhibited a recently preserved example of a new species of Swan, closely allied in external appearance to the well-known Domestic Swan, but having the legs, toes, and interdigital membranes of a pale ash-grey colour, which in the *Cygnus olor*, Ill., are deep black. Mr. Yarrell observed, that this species had been known to him for some years past as an article of commerce among the London dealers in birds, who receive it from the Baltic, and distinguish it by the name of the Polish Swan. In several instances, these swans had produced young in this country, and the cygnets when hatched were pure white, like the parent birds, and did not assume at any age the brown colour borne for the first two years by the young of all the other known species of White Swans. Mr. Yarrell considered that this peculiarity was sufficient to entitle the bird to be ranked as a distinct species, and in reference to the unchangeable colour of the plumage, proposed for it the name of *Cygnus immutabilis*.

During the late severe weather, flocks of this swan were seen pursuing a southern course along the line of our north-east coast, from Scotland to the mouth of the Thames, and several specimens were obtained. The specimen exhibited was shot on the Medway, where one flock of thirty, and several smaller flocks were seen.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,—EIGHTH MEETING, HELD AT NEWCASTLE-UPON-TYNE.

Section of Zoology and Botany.

President.—Sir W. Jardine, Bart.

Vice-Presidents.—R. K. Greville, LL.D., Rev. L. Jenyns, Rev. F. W. Hope.

Secretaries.—Messrs. John Edward Gray, R. Owen, John Richardson, M.D.

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The following communications were laid before the Section; some of which, or authentic abstracts, will be given in our present and succeeding Numbers.

Aug. 20.—On the Botany of the Channel Islands; by C. C. Babington, Esq.—On the Formation of Angular Lines on the Shells of certain Mollusca; by J. E. Gray, Esq,

Aug. 21.—On the Wild Cattle of Chillingham Park; by J. Hindmarsh, Esq., of Alnwick.—On the Production of Vanilla in Europe; by Prof. Morren, of Liège.—On some new and rare Species of British Fish; by Dr. Parnell.—On the *Falco Islandicus* of authors; by Mr. J. Hancock.—On the *Canis jubatus*; by Col. Sykes.—On some Vegetable Monstrosities; by the Rev. W. Hincks.

Aug. 22.—On the Gemmiferous Bodies and Vermiform Filaments of *Actiniæ*; by Mr. T. P. Teale.—Account of an Inosculation in two Trees; by Mr. Wallace.—On a new Species of *Ascaris*; by Dr. Bellingham.—On the Genera *Pinus* and *Abies*; by Captain J. E. Cook, R.N.—On the modern Classification of Insects; by the Rev. F. W. Hope.—On the *Ardea alba*; by A. Strickland, Esq.

Aug. 23.—A verbal report on Infusoria was made by Prof. Ehrenberg*.—Verbal communications were also made by Dr. Parnell on *Clupea alba* (White Bait) from the Frith of Forth; by the Rev. Mr. Jenyns on some species of *Sorex*; and by Mr. Gray on the Boring of *Pholades*.—Report on the present state of our knowledge of the *Salmonidæ* of Scotland; by Sir W. Jardine.—On the Toes of the African Ostrich, and the number of Phalanges in the Toes of other

* The substance of this report has been communicated to us by M. Ehrenberg, and will be found at p. 121. of our present Number.—Ed.

Birds; by Mr. Allis, of York.—On a hybrid *Tetrao,* given by Temminck as a distinct species; by Dr. Charlton.

Aug. 25.—On the *Sternoptixineæ,* a family of Osseous Fish; by Dr. Handyside.—On the distribution of the Terrestrial Pulmonifera; by E. Forbes.—On the annual appearance of the *Lestris* tribe on the coast of Durham; by E. Backhouse, Esq.—A verbal report on the Marsupiata by Mr. R. Owen.—On a new species of Smelt, *Osmerus hebridicus*; by Mr. Yarrell.—On the application of Botany to Agriculture; by Mr. Jerdan.—On noxious Insects occurring in the year 1838; by the Rev. F. W. Hope.

MISCELLANEOUS.

ORCHIDACEÆ.

The public journals have not been wanting in paying due honour to the two most magnificent works which have ever appeared upon the subject of botany, we mean the *Orchidaceæ* of Mexico and Guatimala, by James Bateman, Esq., and the *Sertum Orchidaceum* of Prof. Lindley. It would be invidious to attempt to draw a comparison between them. Each is alike honourable, whether as regards the scientific or pictorial department: each treats of the same splendid, eminently splendid, family of plants; yet there is no rivalry; and so carefully is the introduction of the same species avoided in both, that one work may be considered a continuation of the other, and we trust they will meet with that encouragement to which their merits entitle them. Sure we are that neither the Botanical Magazine nor the Botanical Register combined can record the numerous species of this favourite group of vegetables so rapidly as to keep pace with their introduction. Mr. Gardner from Brazil alone has sent home to our collections many new species, and we have at this moment received from Mr. Moss, of Otterspool, Liverpool, a *Cattleya,* which in size, colour and fragrance may be deemed the most remarkable of this family. Its flowers are $7\frac{1}{2}$ inches across in one direction, $8\frac{1}{2}$ inches in another, 24 inches in circumference! This will very shortly be figured in the Botanical Magazine.

COLLECTIONS OF SCOTTISH AND AMERICAN MOSSES.

Such arrangements have been made with the family of the late excellent botanist and traveller Mr. Drummond, that the extensive collection of mosses made by him in Scotland, and more particularly in British North America and in the southern United States, will be

classed in sets, and offered for sale at the rate of 1*l.* 15*s.* the 100 species of Scottish mosses, and 2*l.* the 100 for those of America; of which latter, however, the northern and southern will form separate sets, several of the northern having been published previously to Mr. Drummond's death, which are already in the possession of those who might therefore now wish to purchase only the southern species. The exact number of each set cannot clearly be ascertained at present (they being in the charge of a botanist, competent to the task, who is naming them), except as regards the Scottish mosses, of which some sets are already prepared, amounting to from 220 to 230 species. It is reckoned, upon the average, that there may be about 80 or 100 of the southern American mosses, and from 150 to 180 of the northern ones. They are good specimens and in beautiful preservation, and can be had loose or arranged in volumes, at the option of the purchaser. Application for sets may be made to Sir W. J. Hooker, in whose hands there still remain a few sets of Mr. Drummond's phænogamous plants from Louisiana and Florida.

DESCRIPTION OF THE ANIMAL OF *PANOPÆA AUSTRALIS.*

M. Valenciennes has recently presented a memoir on this subject to the Academy of France detailing the internal and external organization of *Panopæa australis.* The most recent works on Mollusca enumerate but three species. M. Valenciennes has however shown, that by combining the materials scattered in the various collections and works, that we are at present acquainted with fifteen species of shells belonging to this genus, five of them living in the different seas of the globe, and the other ten fossil, belonging to the various layers of calcaire grossier or to the chalk. Of the living species two are found fossil, but completely identical, in the recent formations of the argillaceous marls of the environs of Palermo; one species belongs to the Mediterranean, the other to the Norwegian seas. —*Compte Rendu,* No. 6, August 1838.

INDUSTRY AND METAMORPHOSES OF THE *ODYNERI.*

M. Leon Dufour has recently presented to the Academy of France a memoir on the industry and the metamorphoses of this genus of insects, describing at the same time several new species. Since the time of Reaumur, who made such interesting researches on this subject, science has remained quite at a stand-still. M. Dufour confirms the correctness of the facts advanced by Reaumur, corroborating them by the description of an analogous but distinct industry in some new *Odyneri.*—*Compte Rendu,* No. 10, Sept. 1838.

LESTRIS PARASITICUS.

A mature individual of the *Lestris parasiticus*, Tem., was shot near Whitburn in the county of Durham, about the 24th Oct. 1837, and is now in my possession.—J. Hancock.

OCCURRENCE OF COPPER IN PLANTS.

M. Wiegmann, senr., has lately announced that Prof. Sprengel of Brunswick had found in the cinders of *Trifolium pratense* 3 per cent. of copper, and that he had also found the same quantity of this metal in those of *Trifolium pannonicum*, cultivated in his garden, the soil of which is very different from that whence the *Trif. pratense* had been obtained. M. Sprengel subsequently examined some trefoils grown in a field, the soil of which did not indicate any traces of this metal in its composition; and was convinced that its existence in the two former was owing to its presence in the ground where the plants were cultivated. The fact affirmed by M. Sprengel proves that a small quantity of a noxious substance may be absorbed by plants without any prejudice to their development.—*Flora.*

OCCURRENCE OF *FALCO ISLANDICUS* IN ENGLAND.

A specimen of the Iceland Falcon (*Falco Islandicus*) in first plumage was shot at Normanby, Yorkshire, March 1837; and another individual in the Newcastle Museum, which is a female and in the mature plumage, was shot in Northumberland a few years ago. These two instances are sufficient to rank the Iceland species as a British bird.—J. Hancock.

METEOROLOGICAL OBSERVATIONS FOR AUGUST 1838.

Chiswick.—August 1. Very fine: heavy rain at night. 2. Rain. 3. Fine. 4. Overcast: slight rain. 5. Cloudy. 6. Sultry, with showers. 7. Showery. 8, 9. Fine. 10. Overcast. 11—16. Very fine. 17. Hazy: slight rain. 18—20. Very fine. 21. Showery. 22. Rain. 23. Showery. 24. Cloudy and fine. 25. Foggy: rain. 26, 27. Very fine. 28. Overcast: lightning at night. 29. Cloudy and fine. 30. Clear and dry. 31. Very fine.

Boston.—August 1. Fine. 2. Cloudy: rain early A.M. 3. Rain. 4. Fine: rain P.M. 5. Fine. 6. Cloudy: rain P.M. 7. Heavy rain with thunder and lightning P.M. 8. Cloudy. 9. Fine: rain P.M. 10. Cloudy: rain P.M. 11, 12. Cloudy. 13—15. Fine. 16. Cloudy. 17, 18. Fine. 19, 20. Windy. 21. Windy: rain early A.M.: rain P.M. 22. Windy: rain P.M. 23. Stormy. 24, 25. Fine. 26. Cloudy. 27. Cloudy: therm. 74° 6 P.M. 28. Cloudy. 29. Windy: rain early A.M. 30, 31. Fine.

Applegarth Manse, Dumfries-shire.—August 1. Rain P.M.: warm and moist. 2. Fine day throughout. 3. Fine day: occasional showers. 4. Moist and cloudy. 5. Heavy rain P.M. 6. Very heavy showers. 7. Showery all day. 8. Fine summer day: cool P.M. 9. Wet throughout. 10. Fair A.M.: wet evening. 11. Drizzling rain A.M.: fair P.M. 12. Fair: shower P.M. 13. Fair: shower at noon. 14. Fair throughout. 15. Fine clear day. 16. Temperate: cool. 17. Beautiful summer day. 18. Cloudy: moist P.M. 19, 20. Showery all day. 21. Rainy all day: flood. 22. Showery all day. 23, 24. Fair A.M.: shower P.M. 25. Very moist: rain P.M. 26. Fair: warm: cloudy. 27. Fair, but threatening. 28. Drizzling all day. 29. Clear and cool. 30. Temperate. 31. Mild though cloudy.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. Roberton; *by* Mr. Thompson *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. Veall *at Boston, and by* Mr. Dunbar *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1838. August.	Barometer.						Thermometer.								Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick. 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	9 p.m.	Fahr. 9 a.m.	Self-register. Max.	Self-register. Min.	Max.	Min.		9 a.m.	9 p.m.									
1.	30·058	30·014	29·904	29·47	29·91	29·73	63·7	71·5	53·5	75	57	63	59	54	s.	s.	calm	sw.	...	·17	...	...	56
2.	29·844	29·844	29·743	29·17	29·58	29·45	66·6	71·0	59·2	69	56	66	60	53	sw. var.	sw.	w.	sw.	·133	·11	·43	...	60
3.	29·738	29·768	29·716	29·05	29·48	29·52	64·7	69·0	58·7	74	59	62	59	56½	sw. var.	w.	calm	s.	·061	...	...	...	60
4.	29·690	29·782	29·606	29·00	29·44	29·36	66·8	71·3	61·7	71	52	66·5	61½	58	s. var.	sw.	w.	s.	·013	·08	·09	...	62
○ 5.	29·574	29·564	29·531	28·95	29·36	29·28	63·3	70·2	58·0	72	56	62	60	56	s.	sw.	w.	s.	·063	·12	·03	2·53	59
6.	29·524	29·592	29·507	28·86	29·25	29·32	63·8	68·7	58·8	70	52	64	56½	56	s.	sw.	w.	sw.	·088	·22	...	...	60
7.	29·732	29·971	29·682	29·03	29·53	29·77	62·5	63·0	55·0	70	50	57·5	58½	55½	w.	sw.	NW.	NW.	·338	·04	·09	...	57
8.	30·056	30·156	30·027	29·43	29·93	30·07	60·5	68·0	54·0	69	42	59	57½	56	w.	w.	calm	NW.	·066	...	·90	...	60
9.	30·236	30·224	30·104	29·60	29·93	29·80	63·5	67·0	51·0	70	55	60	56	54	ssw.	sw.	w.	NNW.	...	·01	...	...	58
10.	30·074	30·118	30·059	29·40	29·78	29·74	63·8	69·0	58·0	73	60	66	58	59½	sw. var.	sw.	w.	sw.	...	...	·06	...	60
11.	30·096	30·108	29·966	29·35	29·73	29·84	68·4	72·0	62·0	75	57	70	61	58	w. var.	sw.	w.	sw.	...	...	·03	...	62
☾ 12.	30·120	30·098	30·077	29·38	29·89	29·90	67·0	72·5	61·0	78	61	65	59	56½	sw.	sw.	w.	w.	...	...	...	0·57	63
13.	30·094	30·222	30·075	29·42	29·90	30·07	65·0	75·6	62·0	76	41	63	57½	53	w.	sw.	w.	w.	...	...	...	...	63
14.	30·262	30·243	30·142	29·63	30·09	30·07	60·6	71·0	51·0	72	46	59	56½	52½	NW.	sw.	NW.	w.	...	...	...	...	56
15.	30·158	30·191	30·134	29·56	30·09	30·10	61·2	68·5	53·0	71	39	59	59	50½	N.	SE.	N.	w.	...	...	...	...	58
16.	30·146	30·133	30·082	29·58	30·04	30·04	62·0	67·0	53·5	75	53	57·5	57	49	WSW.	s.	calm	w.	...	...	...	...	58
17.	30·190	30·248	30·165	29·67	30·12	30·14	58·0	70·0	55·0	70	54	56	55	55½	NNE.	s.	calm	sw.	...	·01	...	...	55
18.	30·254	30·249	30·168	29·66	30·14	30·00	62·5	62·5	58·0	76	56	60	60	53½	WSW.	sw.	calm	sw.	·044	...	...	...	60
19.	30·012	30·011	29·890	29·35	29·72	29·63	67·4	70·6	59·5	76	46	64·5	57	54½	w.	s.	w.	sw.	...	...	...	2·33	62
● 20.	29·832	29·819	29·481	29·22	29·53	29·27	61·2	73·0	60·6	71	56	62	56½	53	sw.	s.	w.	s.	·008	·03	...	...	57
21.	29·358	29·398	29·325	28·68	29·04	28·96	65·5	69·0	59·5	72	51	62	55	53	w. var.	sw.	w.	sw.	...	·09	·04	...	60
22.	29·252	29·313	29·249	28·60	28·83	29·17	60·2	69·0	54·2	66	50	58	54	53½	WSW.	sw.	w.	NW.	·050	·12	.06	...	55
23.	29·468	29·816	29·438	28·87	29·43	29·73	59·0	65·0	54·5	67	46	58	55	51	NNW.	NW.	NW.	N.	·088	·10	·15	...	56
24.	29·966	30·097	29·952	29·40	29·90	29·99	59·0	65·0	51·2	68	41	56·5	55	50	NNW.	NW.	NW.	NE.	·019	·04	·02	...	57
25.	30·102	30·110	30·025	29·54	29·98	29·89	57·0	63·5	49·7	66	48	57	50½	52	WSW.	s.	w.	SE.	...	·09	...	...	54
26.	30·108	30·124	30·090	29·52	29·92	29·89	60·2	65·5	54·0	77	54	60	58	57	NW.	NW.	calm	s.	·066	...	...	0·60	58
27.	30·132	30·135	30·110	29·46	29·92	29·97	68·0	69·0	60·0	81	59	68	59	60	NW.	W.	w.	sw.	·013	...	...	...	60
☽ 28.	30·086	30·073	29·795	29·38	29·88	29·70	67·0	76·0	64·0	82	56	68·5	59½	57½	SSW.	s.	w.	SW.	...	...	...	...	65
29.	29·830	30·175	29·784	29·22	29·94	30·08	62·4	76·0	61·0	67	39	56	54	49	N. var.	N.	NE.	NW.	...	...	·15	...	60
30.	30·190	30·197	30·154	29·60	30·08	30·10	55·4	62·5	46·5	71	38	54	52	55	N.	NW.	NW.	NW.	...	...	...	...	51
31.	30·190	30·183	30·130	29·60	30·07	29·93	60·6	65·8	50·3	75	43	58	55	56	WNW.	w.	calm	sw.	...	...	...	...	55
Mean.	29·947	29·999	29·874	29·31	29·75	29·75	62·8	69·0	56·4	72·42	50·76	61·2	56⅛	53½					Sum. 1·050	1·23	2·05	6·03	Mean. 58·6

ANNALS OF NATURAL HISTORY.

XVIII.—*On the Organic Origin of the Potstones or Paramoudras of Whitlingham, near Norwich.* By Prof. EHRENBERG of Berlin.

AT the late Meeting of the British Association in Newcastle, Mr. Lyell made a very interesting communication on the vertical funnel-shaped flint tubes, three feet in length and one in width, which are filled with chalk, and traverse the horizontal layers of chalk near Norwich and in Ireland. Mr. Lyell intimated that these flint tubes, known by the local name of Potstones or Paramoudras, would probably be found to consist of microscopic organized beings, similar to those which had been discovered in other chalk flints. Prof. Sedgwick was rather of opinion that they had the appearance of being merely petrified fungi, since they quite resembled some forms of large living sponges. Dr. Buckland, who had formerly considered them of organic origin*, at present abandoned this opinion, and viewed them rather as a product of the chemical separation of the silica from its mixture with the chalk, supporting himself by direct experiments which had exhibited similar phænomena.

This difference of opinion among geologists of such eminence and so universally esteemed, induced me to submit these stones to a direct microscopic examination. During my stay in London in September I obtained from the museum of the Geological Society some small fragments of two of these Paramoudras, which have exactly the form of large specimens of *Spongia Infundibulum.* The microscopic examination determined the organic nature of these masses. I failed to discover in the interior of the stone the structure of well-preserved sponges, which the exterior forms represented, and perceived only *contorted* remains of decomposed vegetables (probably in-

* See Trans. of Geol. Soc. First Series, vol. iv. p. 413. where figures of them are given.—EDIT.

deed sponges), and among these, along with many imperfect specimens, some well-preserved microscopic Polythalamia, shells, and Infusoria, of the same species which I have found diffused in like manner in all flints from the chalk, and which therefore very probably may have had great influence at the formation of these very extensive layers of stone. I also readily recognised well-preserved examples of *Xanthidium pilosum* and fragments of *X. ramosum**, together with the Polythalamia, which I have mentioned in my memoir on the Berlin flints.

The sinking of this silica, deriving its origin from organic fragments, by its own gravity, in a funnel shape, through a more solid but naturally still soft layer of chalk, may probably be explained from local circumstances (perhaps from air cavities), which caused the yielding of the yet soft subjacent chalk, where large horizontal flat masses of silica had collected, and could in its pulpy state still sink in the form of a funnel, when the superior layer of chalk pressing down on it formed the core. A heavier body coming from the upper layers of chalk may also have here and there slowly sunk through the soft siliceous masses into the under layer of chalk, and have left these flint funnels behind as indicators of its passage. In the first case, the funnel would always be found closed at the bottom; in the latter open at the top and bottom. In each case it would always be wider at the top and narrower at the bottom. If the flint funnels stood with their wider aperture directed downwards, a penetrating force may have proceeded from below upwards, and in this way ascending gases may have operated. Local observations will easily explain further this interesting phænomenon. The circumstance of the other contemporaneous forms of the English layers of flints being for the greater part compressed in flattened plates, speaks against the supposition that they were well-preserved sponges in which Infusoria and Mollusca happened to be living; and also the remaining upright of such large soft forms is not at all probable; nor does the existing internal structure in any way favour this view. EHRENBERG.

* Drawings of these two as well as of several other species of *Xanthidium* occurring in the English flints will be found in the plates illustrating the Rev. J. B. Reade's Paper in the present number.—EDIT.

XIX.—*On the Genera* Pinus *and* Abies, *with Remarks on the Cultivation of some Species.* By Capt. S. E. Cook, R.N.*

The extraordinary interest which has been excited by the introduction of the various species of *Pinus* within the last few years, may make a few observations respecting them, more especially on their œconomic value, acceptable.

By the zeal and activity of our own and foreign collectors, seconded by the assistance of various bodies and of wealthy individuals, we are provided with a list of about seventy species of *Abies* and *Pinus*, exclusive of the junipers, cedars and other kindred *Coniferæ* which now ornament our collections. The greater part of these may be considered as well-defined species or varieties; whilst, as is inevitable from the comparative novelty of the subject, and the want of public gardens and repositories for the purpose of standard reference, which to the discredit of the authorities and the prejudice of the public good we are yet without, a portion derive their appellations from the gratuitous assistance of those who are interested in multiplying names, and frequently confer them where no real distinction exists.

It would be impossible within moderate limits to give even a short notice of this long list individually. At present it is intended merely to form them into groups, reserving more detailed observations for the Europæan species, which are by far the most interesting in a national and œconomical point of view.

We propose to divide the seventy species above-mentioned into the following groups: 1st. *Old America*, if we may use the expression, which includes the United States west of the Mississippi, and Canada with Labrador, and extends to the limits of vegetation to the north. 2nd. Those species which are produced in the magnificent range which separates the waters of the Atlantic from those of the Pacific, commonly known by the barbaric appellation of the Rocky Mountains, for which the "Northern Andes" or some native term, if such could be obtained, ought to be substituted. This, which at present forms about fifteen species, we shall designate by the name of

* Read in the Section of Zoology and Botany at the Meeting of the British Association, Newcastle, and communicated by the Author.

the "*Douglas group*," as we owe most of our knowledge respecting it to that lamented traveller, whose memory well deserves such a compliment. The 3rd is that of the uplands of Mexico, of which we already possess a few specimens. The 4th is composed of the species newly discovered to clothe parts of the Himalaya mountains. The 5th is that of Europe.

We should gladly make another division of the Caucasus and mountains of the north of Asia, but as yet our information is too incomplete to enable this vast portion of the globe to be regularly placed in the series.

The first group, that of the United States and Canada, presents every variety of form and size to the number of about twenty species. Of the whole of this list, although many of them are of the noblest port and dimensions, none produce timber of more than second-rate quality, and the greater part only of very inferior value. Many of these kinds are found in the depth of enormous and primæval forests, where they are sheltered from every wind, and draw their nourishment from the richest alluvial soil covered by the successive vegetable deposits of countless ages, in a climate where a severe but steady winter is rapidly succeeded by an almost tropical summer. We can easily imagine that under these circumstances the rapid growth of timber may be fatal to the solidity of its texture, and consequently to its durability; but how are we to account for the same quality pervading that of the species which are grown on dry and sandy or rocky uplands, or on the bleak coast of Labrador, in climates resembling those of Russia and Norway, in which our finest timber is produced? Such, however, is the undoubted fact, and it is equally singular that none of these species grow well in Europe, our best specimens being little more than abortive representations of the individuals they are descended from when seen in their native forests. As in the œconomic point of view, therefore, they can neither be considered as very useful nor even ornamental, we shall not make any further remark upon them.

Far other anticipations may be indulged in respecting the Douglas group. Without being over sanguine, there is little doubt that amongst the gigantic species forming it, of which we are already acquainted with about fifteen, we shall make

some valuable additions to our woodlands. One species already known, the *Abies Douglasii*, according to the accounts transmitted to Dr. Lindley, which are fully borne out by the appearance of the timber and the growth of the young trees in every part of England, appears to possess the qualities of the larch, of durability, quick growth, and utility when young, with the advantage in some respects of being an evergreen. We earnestly entreat all cultivators to attend to this species, which, in the absence of seed, which we hope will shortly be supplied from our own trees, is readily propagated by cuttings. Our acquaintance with these Californian forests is too recent, and the habits of the people who frequent them too barbarous, to admit of our possessing much certain information respecting the nature of their timber; but as, by the munificent care of the Duke of Devonshire, collectors are now in the country for the express purpose of collecting large quantities of cones of the kinds already known, and of making further discoveries, it is to be hoped we shall soon possess more ample knowledge of them.

It is very much to be regretted that Government does not take advantage of this period of profound tranquillity, and in concert with the Fur Company cause a line of permanent settlements to be made across some parts of the chain. By this means we should obtain valuable and certain information on these and other interesting subjects; and by carrying the same system through Upper Canada, the Anglo-Saxon race would be established from Labrador to the Pacific across the whole continent of North America.

The species which have been as yet sent from Mexico are few in number and of too recent introduction, to warrant delay in giving detailed accounts of them, and it is more than probable they may be found rather remarkable as tropical species than for any superior qualities to be expected from them.

From the Himalaya range, our species, although as yet but few in number, are on a scale we should expect to find in such a chain of mountains. The Europæan species are in some degree represented amongst them, as we have silver and spruce; and there is a cedar in place of that of Western Asia. From the comparative advanced state of the inhabitants with those of the American forests, we may look for better accounts of the

quality and durability of their timber; and the enlightened patronage of the India Company, seconded by the unwearied zeal and ability of their officers, will no doubt enable us to add materially to our list of this interesting region. The *Abies Webbiana*, a gigantic silver fir, probably the noblest of the tribe, has not perfectly stood this winter near London, although it has in my neighbourhood. It may probably become inured to the climate, and the *A. Morinda*, their spruce, which has stood uninjured, well deserves attention. Both species are propagated easily by cuttings.

In the northern parts of the chain our travellers might meet with the *A. pichta*, the silver fir of the Altaian chain, which seems to be a most desirable tree to possess; and in the mean time, through the assistance of the Russian Government, which in matters of science is extremely liberal, seed might be procured in sufficient quantity to make the trial it so well deserves, as it ought to equal in hardiness if not surpass any of our Europæan species.

The last and most interesting group on the whole is unquestionably that of Europe. We are now tolerably well acquainted with the species that are spread over this portion of the globe, from the arctic circle to the shores of the Mediterranean and the confines of Asia and Africa. By far the greater part of these are of considerable, and some of surpassing value. In taking the range from south to north it will be found that the qualities of the timber become more valuable, as the tree which produces it grows naturally at a higher elevation, latitude, and level above the sea, one or both entering into this calculation. The same tree which grows spontaneously on the shores of the Baltic is never found in a similar situation on those of the Mediterranean, but as it approaches the south gradually ascends the sides of the mountains in search of a more congenial climate. We also find that there is no instance of a species which grows naturally at a low elevation producing good timber, the improvement in quality being as nearly as possible in a direct ratio from south to north, or in the degree of winter's cold they are able to resist.

To prove these positions, which we shall find afterwards to be of some importance, we shall proceed to analyse some of the principal species, following the descending scale.

We may take the *P. sylvestris*, the hardiness and good qualities of the timber of which are so well known, as a point to commence from. Two Europæan species only of *Pinus* to my knowledge claim to live at a higher elevation than the Scotch fir; these are the *P. Cembra* and *P. uncinata*. The *Cembra* grows in the very highest of the northern and central Alps, and, wherever I have seen it, above the other forests. There are a few remaining on the Montanvet at Chamouny, apparently because they were not worth removing, nearly all the good specimens in that locality being extinct. It grows in the coldest parts of Siberia. The timber is superior to that of the *sylvestris*.

In like manner the *P. uncinata* forms a complete zone in the high Pyrenees, where it is placed above the *sylvestris*. The timber is of higher value than that of its less hardy congener.

The *sylvestris* itself is found from Norway to the south of Spain, where I found two ranges of forest; one in the Sierra de Guadarrama, or great central chain of Spain, where it forms the upper zone; the other in the Sierra de Cuenca (lat. 41°), of which it occupies the northern summits, and is floated down by the western arm of the Tagus to supply Madrid with building materials. This is, as far as I know, its southern habitat. Its place in hardiness and value consequently is nearly but not quite the first.

The next in rank are two species which I shall place together, because their geographical site and elevation as well as quality seem to indicate the propriety of doing so, although they are wholly distinct from each other, the *P. Laricio* and *P. hispanica*. The *P. Laricio* is found, as far as any authentic information we possess goes, exclusively in the central parts of the lofty island of Corsica, in lat. 43°, where it grows at a moderately high elevation, and does not descend to the shores of the Mediterranean.

The *Pinus hispanica*, which as yet has been found only in Spain, I found to range from the Sierra de Segura, in lat. 39°, to the foot of the Pyrenees, in lat. 43°. It grows generally at an elevation of 2000 to 3000 feet, and not to my knowledge higher nor lower. It has erroneously been represented by some writers to extend into France. The fact is, in the locality where the forests of the *hispanica* are placed, between the

rivers Cirna and Essera, it is separated from the French territory by leagues of distance and thousands of feet of elevation. The frontier line in that part extends for a great distance amid the Siberian altitudes of the Maladetta and Mont Perdu, far above the limits of arboreal vegetation. The forest mentioned in the 'Arboretum' as at the Port de Scez, is of *uncinata*, and is Spanish and not French.

Independently of other differences between these species, which are quite distinct, the *Laricio* is highly resinous, the *hispanica* white and dry in the timber. The former tree assumes the umbellate form, which the *hispanica* does not, its growth being singularly free and elegant; and it is more clear and transparent both in the bark and foliage than its geographical neighbour.

In the scale we propose the timber of both these species ought to be of the middle quality, better than those below them, and inferior to the preceding species which are higher in the scale. This is precisely the case; and the *Laricio* is rather the better of the two, its habitat being colder than that of the southern natural site of the *P. hispanica.*

The *Pinus Pinaster*, and *Pinea*, or stone pine, are next on the list. There is little difference in the habitats of these species, or in the value of their timber. I found the *Pinaster* to occupy a regular zone below the *sylvestris*, in the central range of the Guadarrama. If there be two varieties, which is doubtful, this is identical with the Pin des Landes; and taking altitude and latitude both into account, these localities, which are about its northern limit, pretty nearly correspond with each other.

The *Pinus Pinea* has its most northern natural habitat, as far as I know, taking the elevation into account, in the plains and uplands of Old Castile, which is further north than that assigned to the *Pinaster*, but it is certainly less hardy than that species in other climates. These pines, growing thus far north and at a rather high elevation, ought to produce good timber, whilst that of both is notoriously the contrary. How does this happen? Because these northern sites are not the general or exclusive habitats of the species, both of which descend to a very low level. In the same country the *Pinea* is found growing spontaneously in the sandy wastes of Andalusia, in the Tierra Caliente of Spain, in the zone where the

palm and the cactus are found along with it; and the *Pinaster* inhabits the warm valleys of the Serrania de Ronda, at a low elevation above the Mediterranean, in a corresponding situation to which, along the coast of Provence and in the Ligurian Apennines east of Genoa, it is also met with.

These species, which are next below the *Laricio* and *P. hispanica*, produce, as follows from the localities assigned to them, timber of inferior quality to the species inhabiting the zone above them; the *Pinea* I believe being rather the better of the two.

There now remains the *halepensis*, of which three varieties are found along the shores and inlands of the Mediterranean, nearly throughout its whole extent. The three varieties are that with large red cones, which is the common, and I think only species in Spain, and is probably the more hardy; the second has small cones, and was found on the Riviere of Genoa; the third is the *P. Brutia* of Professor Tenore. There is a tree in the Botanical Garden at Naples. The northern habitat of this tree in Italy is Romagna and the Vale of Terni, and in Spain the Alcarria, a high but genial district of New Castile, where I found it abundant; below the *Pinaster* and *P. sylvestris*. Its site is thus the lowest in the Europæan series; and whilst the palm of beauty must be ceded to it beyond every other in form and colour, for œconomic purposes it is the most worthless of the tribe. A complete confirmation of the relative hardiness of this species has been afforded last winter. Near London and through the greater part of the north of the kingdom the *halepensis* may be considered to be extinct. I have lost two varieties, whilst the *P. hispanica* and *Laricio*, which were growing by their side, are wholly unscathed.

These observations embrace the principal species of the centre and west of Europe; the *P. Pumilio* is omitted, as not being a timber tree, though it is only precluded by its scanty dimensions from being in the first rank, to which its port, and hardiness appear to entitle it.

Before we proceed to the *Abies* and *Larix* we must notice two species which appear to be nearly allied, the *tatarica* or *Pallasiana*, and the *austriaca*.

The locality of the former is the Crimea, and we can scarcely,

from its occupying a district so distinct from any other, place it regularly in the European series. It is, however, beyond doubt of the upper or better class, and most probably hereafter its true place will be found amongst the zones of the Caucasus and Northern Asia.

The *austriaca*, which appears to be nearly allied to it, as they probably bear about the same relation to each other that the *hispanica* does to the *Laricio*, has been recently introduced by Mr. Lawson of Edinburgh. Not having seen or examined the forests which supply it, I cannot yet assign it a specific place; but it is no doubt entitled to a very high rank in the upper series, and promises to be a most valuable addition to our arboretum.

We now proceed to the *Larix* or common larch, which is spread from the Southern Alps to Siberia, but I believe never grows naturally at a low level, excepting far to the north. The most southern site I know it to inhabit is in the high Apennines, near their junction with the Alps in Piedmont. In this part were, and I suppose still are, as I was informed by the Piedmontese engineers, vast and almost inaccessible forests of trees of the largest dimensions. It is common in the highest Piedmontese Alps around Mont Rosa and Mont Blanc, and in ascending the Great St. Bernard is seen far above every other tree. I have little doubt, however, that it once was overtopped by the *Cembra*, which in the adjoining valley of Chamouny holds the highest zone. It thus claims the high place its hardiness and value of the timber so fully bear us out in assigning to it, on the theoretic examination of the zones it naturally inhabits.

In Scotland it appears to thrive at a higher level than the *sylvestris* by the report of the Duke of Athol; but although a most valuable and important fact, it may be from local causes, and these observations are confined to the natural position of the tree in its original forests. We shall be anxious for future information whether the larch of Siberia and of the centre of Europe be identical, of which we have some doubts; and it would be very desirable to ascertain the fact precisely, which could easily be done by correspondence with the Russian Government and the authorities of Odessa.

The *Abies* now claim our attention. We do not adopt the

fanciful term of *Picea*, and divide the class, because of the difficulty of making a true demarcation; and that the species of Europe are too scanty in number to make it necessary. Besides these reasons, the term is not truly applied, some other pines producing turpentine in greater quantities than that on which this name has been conferred.

The *Abies* do not supply us with the same extended series of observations which we have traced in the *Pinus*. They are also inferior in the absolute quality of their timber to the best of the preceding genus, and we suspect, but want data to affirm its being generally the case, that is so through the groups, and that the *Abies* fall below the *Pinus* in œconomic value. It is certainly so in the Europæan series.

The first in hardiness is the *Abies excelsa*, or common spruce, which ranges from Lapland to Savoy, south of which it is not to my knowledge found in the natural state. It certainly does not, nor ever did inhabit the Pyrenees, as asserted by some writers. It would appear to live further north than the *sylvestris*, its only neighbour in the north of Scandinavia; but it is possible, that dampness of soil, which it resists better than any of the tribe, may be the cause of this apparent greater degree of hardiness. Although its timber, which is dry and light, may not equal that of some of the kindred species in utility for some purposes, it is a most valuable tree and well worthy more attention than it has received in an œconomic point of view.

The *Abies pectinata*, or silver fir, is unquestionably less hardy than the last-mentioned species. It ranges less to the north and further to the south than either the *sylvestris* or *excelsa*. Extensive forests of it exist in the Pyrenees, where it is placed in a regular zone below the *P. uncinata* and *sylvestris*, and next above the beech. It descends into the comparatively genial climate of Navarre and the Basque Provinces, and as a variety even into Greece.

The common silver fir is not to my knowledge found beyond the Baltic, and it is probable that those reported to exist far north in the East of Europe are the *pichta* or *Altaian* species.

A variety has been recently found in Cephalonia, on which

it is to be regretted that the local name (*A. cephalonica*) should have been conferred, for there can be no doubt that the same species forms the capping found by the French Savans who recently visited that country, to cover the loftiest summits of Mount Taygetus, in the centre of the Peloponnesus, and *hellenica* or *græca* would have been a better distinctive appellation. This with the common species of Europe and the *pichta* forms three varieties, which no doubt will be found to differ in quality as in hardiness, when we have the opportunity of minutely comparing them.

These absolute zones or degrees of ability to resist the cold can only be collected by extensive observations and comparisons of many regions, but when treated on that scale are constant and unvaried. There are localities notwithstanding, where the species nearly allied in hardiness meet as upon neutral ground. The Splugen is one of these. In passing that wild mountain, five years since, I took up in the same part of the Rheinwald, plants of *P. sylvestris*, *A. excelsa*, *A. pectinata*, and *Larix europæus*, which were thus congregated; and in judging hastily it might have been inferred that the species grew naturally at the same degree in elevation, which, as we have demonstrated, would have been erroneous.

We now proceed to the application of the facts on which the foregoing observations are founded, namely, to show the practicability of cultivating some species of *Pinus* on a large scale, with a view to the increase of our national resources, and to render the payment of enormous sums annually for timber hereafter in a great part unnecessary. There is no question whatever that the Grampian mountains, instead of being as at present, in great part an unproductive waste, would, if properly managed, at a cost comparatively trifling, enable us not only to provide for our own wants, but even to export timber, instead of being, as we are at present, wholly dependent on foreign countries for this necessary of life.

We are indebted for our attention being called to this important subject by the prudent and calculating foresight of the Dukes of Athol, who in laying the foundation of enormous wealth and power for their descendants, have shown the policy which ought to be followed by the nation.

The last Duke of Athol calculated that the possessor of his woodlands on the Tay would in a few years be as rich or richer than any individual in Britain! What are these woodlands? They consist of about ten thousand acres of larch, planted in great part upon barren moor land, the aggregate value of which was a very few hundreds per annum! How different our Administrations manage these things! We are at this moment almost dependent on foreign Governments for permission to buy the timber, which, with hardly any cost, we could produce in the same way that this princely fortune has been founded. We are now actually buying larch timber to build steam boats from the Italians! We are annually laying out enormous sums for the growth of oak, of which one large portion, that of Staffordshire, is avowedly of bad quality, whilst no attempt is made to grow fir, of which a rapid and most enormous profit may easily be made. To show the relative value of an acre of larch in the north of Scotland with one of oak in the New Forest, or that of Dene, we will take the mountainous declivities of the Grampians at 2*s.* per acre; we take this value, which is very high, because Governments always purchase dear, and because only the ground best suited to the purpose should be selected. Land which would produce larch admirably in the Grampians is worth not more than 6*d.* per acre of annual rent.

In Hampshire or Staffordshire no land which will grow good oak is worth much less than 2*l.* per acre, thus making, at the high computation for larch, twenty times the value for the same extent. But by the calculations of the Duke of Athol ten acres of larch would suffice for the same purpose as seventy-five acres of oak, on account of the trees growing so closely, and that there is little ground lost. This makes a seventh or less; therefore the respective values of land in the Grampians and in the south of England, if applied in this manner, are one to one hundred and forty, and the cost of larch compared to that of oak would be the one hundred and fortieth part, the time required for the maturity of each being taken at seventy to seventy-five years. It seems incredible that a subject fraught with such momentous consequences to the nation should have been wholly or entirely overlooked by those who have the dis-

posal of our resources, and that no steps should have been ever thought of to effect a purpose which would immortalize the memories of those who should first set about it, and lay the foundation for wiping off the national disgrace of being without forests, whilst we have the most ample means of creating them. Besides the common and well-known advantages of the larch, which are in the quick growth and unparalleled excellence of the wood, there are other not less cogent reasons for recommending it as the chief or staple produce in a system of national forests. Not only the thinnings are more productive than those of any other tree, but the prodigious increase of value in the soil which is derived from the fertilizing power of its spiculæ must be taken into account. In fifteen to twenty years lands planted with it could be safely let as sheep pasture, and the rents would soon increase so as probably to defray the expense of purchase, or at last pay a very good interest for the money expended in the first instance; thus adding another increase of national resources by converting waste into productive soil.

Besides the low value of land in these districts, which is so strong an œconomical recommendation, there are others in favour of the north of Scotland. The rocks in the Grampians are chiefly primary and many of them igneous, which are extremely favourable to the growth of timber, especially of the larch, which requires free drainage and a dry subsoil. In this description of ground alone is the tree seen in its true form as in the alpine forests, throwing out enormous arms and vying in picturesque beauty with the other inhabitants of the woods. It may be urged, in answer to these observations, that there are abundant plantations already in the hands of private individuals, and that in case of need the country will have the benefit of their outlay. It is very clear that no certainty can exist in such calculations. The caprice, extravagance, avarice, or cupidity of private persons may at any time operate to the serious injury of the public. What has become of the ancient Caledonian forests, the last remains of which have been swept away in this generation? The history of the mines which surround us is sufficient proof how little individuals frequently look beyond the moment they require pecuniary supplies.

The volcanic appearance of the heights on every side, and the treasures which are being consumed for ever, are sufficient proof of the futility of calculating on such resources, and show that we ought to create them, as we have the power to do, in fee simple, making ourselves alike independent of individuals and foreigners.

By devoting 100,000 acres, which is about the size of the larger Highland estates, to this purpose, we should in seventy to seventy-five years, proceeding on the calculation of the Duke of Athol, that in the same period his forests would be worth five to six millions sterling, be possessed of national capital to the amount of fifty to sixty millions in timber alone, besides a large tract of mountain pasture returning an ample annual revenue, and all this with an outlay in the first instance comparatively trifling. It is needless to observe that this immense result cannot be obtained, or even the entire foundation laid, in a moment, but must be attained by steady and systematic perseverance, like that of the individuals above-mentioned who have bequeathed us so noble an example. By the creation of forests on this scale, we should make some reparation for the consumption and destruction of the vast mineral treasures, on which vital staple of national wealth the operations of this generation will about that period begin to be seriously felt.

Although the larch unquestionably far exceeds every other tree for the purpose we are speaking of, it would be most desirable that some of the evergreens should be grown on scales according to the results of experience of their utility and the fitness of the soil and situation to bring them to perfection. It is hardly necessary to observe that we should only recommend those of first-rate properties, as shown in the list we have gone through.

The *P. Cembra*, of which the timber is perhaps superior to that of any other species, labours under the disadvantage of being extremely slow of growth. However, the trials made in this country are as yet not sufficient; and it can only be fairly tried on dry hills or mountain sides, clay soil and flats being unsuited to it; and very probably it might be improved by grafting the *P. sylvestris* in the Tchoudy manner.

The *uncinata* is considerably quicker in growth than the

Cembra, and being superior in quality to the *sylvestris*, would require trial as soon as seeds could be procured in sufficient quantity, which at present must be done from the forests in the Spanish Pyrenees. The *sylvestris* of course would have its place in localities suited to it.

The spruce would claim the greatest consideration, especially in damp soil, which might be found unfavourable to the larch, and where warmth and shelter were required. It is extraordinary that in a country so congenial with Norway this tree should not have been tried on a larger scale by the Highland proprietors. We remember being struck with the grandeur it would impart to the magnificent though denuded fall of Fyers.

The silver fir would no doubt repay the cultivation in certain localities suited to it, its growth being very rapid; and it resists the wind much better than its last-mentioned congener. The writer knew an instance where, near Plymouth, the proprietor of an estate there was offered by the people of the dock-yard 100 guineas for a single tree of this species; it was during the war and the highest prices; but as that tree would not occupy a space of more than forty feet in diameter, we may conceive the value of an acre covered with such trees*, and its age probably was not above seventy years. An establishment of the sort we are contemplating would require space to be devoted to trials of such other species as might prove desirable to acclimatize, such, for instance, as the *P. austriaca* and *Pallasiana*, *A. Douglasii*, *A. pichta*, &c. &c.

We must now conclude with a few hints to individuals on other species, more especially to those who reside or have pro-

* Since this paper was read the writer has received a communication from Mr. Salvin of Croxdale, near Durham, who possesses extensive woods and has given much attention to the subject. He states that the silver fir, when felled and left on the ground, resists the effects of a humid climate and damp soil, well fitted for such a trial, better than the larch. As it is perfectly well known that the timber of the one species is very much inferior to that of the other, we were at first rather struck with this curious fact. It is strongly denied that there is any inferiority or defect in the larch such as is apt to be the case when grown in soil unsuited to it, which indeed rather affects the inside than the outside of the tree. The solution we suspect to be the following: that the heart of the timber is preserved by the turpentine, which is deposited in the outer layers; and we hasten to announce this most important and valuable information, in order that experiments may be made on the silver fir as pile timber, for which, if the phænomenon here mentioned be general, the tree will, in every respect, be most admirably suited.

perties in the west and south of England. The larch cannot be grown to much profit as timber on cold wet lands, whatever be the climate. The pines of the middle class, *P. Laricio* and *P. hispanica*, we have not the smallest doubt might be grown to advantage on Dartmoor or Exmoor, South Wales, &c., and it is to be regretted that proprietors should have planted so bad and useless a tree as the *Pinaster*, which has been done in some of those counties, where these better species would thrive equally well or better.

The cedar of Lebanon might be grown for profit by care at first in any part of the south of England. They may be easily raised from cuttings, the modes of which as well as the grafting pines may be found in that excellent work Loudon's 'Arboretum', the vast quantity, and condensation of information in which makes it invaluable to the tree cultivator. The prejudice against trees raised in this manner is quite unfounded: we might with quite as much reason declaim against propagating by layers, which, in many species, is our only resource when the tree does not ripen seeds in this climate.

We have one more observation to make respecting the larch, which is more particularly addressed to those who possess estates in the adjacent counties, and especially in the higher and colder parts. It is to call their attention to the planting larch as an improver of soil. There is no doubt whatever, by draining our cold clays, and planting larch alone, that after fifteen to twenty years thinning them to open order, sheep could be admitted with perfect safety. After that, by regularly opening them out, the land would be prodigiously increased in value as pasture, and the last trees could remain until they were wanted, or that the tops should supply the unerring information that they had done their best and must be cut down. It is necessary to observe that belts or strips will not answer the purpose, but that planting with this view should be in solid masses, or squares or oblongs, from east to west, and also that in this system we do not recommend, but on the contrary deprecate, the mixture of other trees, especially oaks, to the vain and useless hope of growing which so much capital is uselessly expended. In short, according to our calculation, the larch is to be used merely as a fructifier

or ameliorator, the trees remaining to defray the expense and loss of time. The prejudice of the damage done to trees by sheep is groundless, compared to the benefit to be derived from their use as here recommended; and we are quite sure that it could be acted on with the greatest benefit to the land and to that of the vicinity by the shelter afforded, and that the value of every estate, large or small, would be very much increased by the general adoption of such a plan.

S. E. Cook.

Carlton, 16th August.

XX.—*Letter from* Captain DuCane, R.N., *to the* Rev. Leonard Jenyns, *on the subject of the Metamorphosis of* Crustacea*. With Plates VI. and VII.

Southampton, August 20, 1838.

Sir,

The British Association for the Advancement of Science having requested me to present a report at its Meeting at Newcastle this year on the subject of the metamorphoses of the *Crustacea* in the Southampton waters, I beg to trouble you with the following observations relative to the metamorphoses of the ditch prawn (*Palæmon variabilis*) and common shrimp (*Crangon vulgaris*), which I shall be obliged by your laying before the Association.

I last year, through Mr. MacLeay, presented drawings of the larva of the ditch prawn, exhibiting the appearance it presented from the time of its first exclusion from the egg till the end of the third day, when my specimens died. I have not this year been able again to obtain the larva of the prawn direct from the egg; but the ditch which is the locality of this particular species, having supplied me with the larva in great abundance, I have been enabled very satisfactorily to trace the various changes it is subject to in the progress towards its adult state.

These changes, as shown in the accompanying drawings, are four in number; the three last may however, I think, rather be considered as a gradual and progressive development

* This important letter arrived at Newcastle too late to be read at the Section of Zoology and Botany.—Edit.

of the parts of the adult animal than an actual metamorphosis.

The drawings Nos. 1 and 2 represent the appearance of the larva on its first exclusion from the egg, and excepting in being more accurately drawn, I am happy to find that they do not differ materially from the hasty sketches I had an opportunity of making last year at the end of the third day. No. 1. shows the animal as it appears in motion in the water; No. 2. as viewed when lying on its back, in which position the rudiments of the true legs are visible, doubled up under the thorax.

No. 3. is the larva in its second stage, ascertained by observing the moult of the former. It has now one serrature on the dorsum of the cephalothorax: the eyes have become pedunculate. It has five pairs of natatory legs; and its proper legs, both walking and prehensile, are developed: the rudiments of subabdominal fins are becoming visible, but the tail continues spatulate as before.

No. 4. is its third stage, also ascertained by witnessing the moult. The larva has now two serratures or spines on the cephalothorax, the legs are the same as in the second stage; but the subabdominal fins are more developed, and the tail has acquired two leaflets on each side, one of them being delicately fringed, the other still only in a rudimental state.

Nos. 5. and 6. represent the larva in its fourth or last stage, as it appears swimming in the water and lying on its side. I have however not had an opportunity of observing the moult in this case. It is evidently the same animal as is drawn by Mr. Thompson in Jameson's 'Edinburgh Journal' for July 1836. The larva has now three serratures, six pairs of false or natatory legs, and the true legs resemble those of the full-grown or perfect prawn; the subabdominal fins are still further developed, and the tail also approaches nearly to that of the adult animal, which I had the satisfaction of observing in the condition its next moult brings it to. It then becomes a true *Palæmon.*

It is a curious and interesting circumstance in tracing the changes of this larva to observe, that through all its conditions its movements are retrograde; but no sooner has it divested

itself of this last envelope and got rid of its natatory legs, than the subabdominal fins, which have hitherto been unformed and useless, come out ornamented with a delicate hair-like fringe, and become the organs by which the prawn advances in the water, and which are kept constantly in the same rapid motion that the natatory legs were kept in whilst the animal was in its larva state. The animal henceforth also ceases to move backwards, excepting for the purpose of avoiding danger.

Nos. 7. and 8. are drawings of the larva of the common shrimp (*Crangon vulgaris*): the larvæ were kept seven days from the time of their exclusion from the egg, and were then destroyed in consequence of my leaving home; they had at that period undergone no change. The general character is the same as the larva of the prawn, but they have in this stage only three pairs of natatory legs; and it is remarkable, that their movements, instead of being retrograde like the larvæ of the prawn, are constantly rotatory, excepting when they come in contact with each other: they then dart suddenly off in a lateral direction; the rudiments of the true legs were visible, but too minute to be enumerated.

The above particulars, following up as they do the progressive changes in the prawn, and confirming the valuable observations of Mr. Thompson as to the fact of the macrourous decapods being subject to metamorphosis, will I trust be acceptable to the Association, and excuse my troubling you in such detail.

I have the honour to be, Sir,
Your very obedient Servant,
C. DuCane.

Rev. Leonard Jenyns,
&c. &c. &c.

Extract from a Letter on the same subject from Capt. DuCane, R.N., *to* W. S. MacLeay, Esq.

The larvæ mentioned in the paper, unfortunately sent too late to the British Association, were taken from a salt-water ditch in this neighbourhood. I have since hatched the ova of some ditch prawns in pure fresh water, although I had previously kept them upwards of a month. The larva on quitting the egg corresponded precisely with my drawings Nos. 1. and 2.

which I have given as representations of the first stage. On the third day after exclusion they had undergone no change; but on the fifth (I had no opportunity of examining them on the fourth) several of them had moulted; and on the sixth I had the satisfaction to observe two of them in the very act of shaking off their first envelope. The abdominal section was cast in one piece, the cephalothorax in a second, and the animals were struggling to divest themselves of their antennæ and legs. I looked at this interesting operation for a considerable time, and even made some attempts to assist them in their endeavours, but they appeared to be exhausted by their struggles, and in fact the following morning I found them dead. I thus lost the whole of them before they underwent their second change; however I was glad to find that these larvæ after their first metamorphosis had only one spine on the back of the cephalothorax, as is represented in fig. 3.

I have recently been making some observations upon Thompson's "opossum shrimp" (*Mysis Fabricii*, Leach). It is certainly a very interesting animal, but I rarely find one with a pouch, and only in one case have I yet found this pouch to contain the young.

I did intend, had I been able to go down to Newcastle, to take with me my specimens of different woods as they have been eaten by the *Limnoria terebrans*. I hope now to be able to show them to the naturalists at Birmingham. We are repairing our pier by substituting new piles covered with iron nails for those that have been destroyed by the ravages of that animal.

XXI.—*Notes on the Hairy-armed Bat* (Vespertilio Leisleri), *and on its occurrence in the Eastern part of Norfolk.* By Thomas Paine, Jun., Esq.

[With a Plate.]

When in Norwich a short time since I observed at a bird stuffer's shop in St. Giles some specimens of a bat which was unknown to me. Having procured one, it was found on examination to be the hairy-armed bat (*Vespertilio Leisleri*) of which a description and figure are given by Mr. Bell in his 'History of British Quadrupeds.' There were eight others

with it in the shop, all of the same species, and the information given respecting them was, that there were fourteen taken from an old hollow tree in a village in the vicinity of Norwich. The specimen described was the largest among them.

The *Vespertilio Leisleri* is smaller than the Noctule, and the membrane rather deeper in proportion to the size of the animal than in that species; the upper jaw projects considerably beyond the under, and rather more than appears in Mr. Bell's figure; the ears are hairy within, the tragus rounded, scarcely half the length of the ear; the tail is exserted very little, if any, beyond the interfemoral membrane.

The muzzle is naked and dusky; the ears horn-colour, edged with dusky. The head, neck, shoulders, and all the upper parts of the body are bright chestnut brown; the lower jaw nearly black, the throat of a dusky brown, and all the lower parts of a dusky yellowish brown; a ridge of hair runs all round the body of the bat both above and below on the interfemoral membrane, varying from two to six lines in width; along the fore-arm on the inner surface of the interfemoral membrane is a quantity of reddish brown hair, rather thinly scattered in the middle, but more close near the wrist, and nearly half an inch in width. The membrane is dusky, nearly approaching to black.

	inch.	line.
Length of head	0	10
——— of head and body	2	11
——— of ear	0	5½
——— of tragus	0	1¾
——— of fore-arm	2	0
——— from the knee to the extremity of the toes	1	2
——— of the tail	1	8
Extent of the flying membrane	12	2

From these measurements it appears that the present specimen is considerably larger than that described by Mr. Bell, which was said to be the only English occurrence of this species. His animal was probably a young one, as the colour of the under parts as given in the 'British Quadrupeds' is much darker than in this specimen.

It is said by Mr. Bell to frequent hollow trees, where it congregates in vast numbers unaccompanied by any other species.

As Mr. Bell's figure represents the front view of the animal, and as no coloured representation of it of which I am aware has yet appeared, the dorsal aspect has been chosen for the present figure, Plate X.*, which shows the bat of half the natural size.

By way of conclusion to this short notice I have only to observe, that the various species of bats are (in this neighbourhood at least) not sufficiently studied, and there is no doubt that by diligent research many of those species which are now considered rare would be found to be comparatively common, and to have been mistaken for those well-known species to which the greater part of them are closely allied.

Great Yarmouth, June, 1838.

XXII.—*New British Insects indicated in Mr. Curtis's Guide.* By A. H. Haliday.

[Continued from p. 121.]

Diptera.

Culex detritus, C. 1137. 9^{b}.—Ent. Mag. i. 151.

This seems to be the original *C. pipiens* of Linnæus. The insect described by Meigen under that name is a very different species and not uncommon.

Bibio nigriventris, C. 1179. 4^{b}.—Ent. Mag. i. 157.

I have now ascertained that this is the other sex of *B. albipennis.*

Cordyla fulveola, C. 1174. 2.

This is the other sex of *C. fasciata.* The sexes in this genus differ both in the form of their antennæ and the number of joints, which also varies according to the species. There are two minute ocelli in all that I have examined, but they are easily distinguished from the *Mycetophilæ* by the enlarged basal joint of the palpi, on account of which Macquart has called the genus *Platypalpus* †.

* It being our intention, as will be seen in the notice on our wrapper, to give a supplement of plates at the end of our volume, we must reserve the present one for that opportunity.—Edit.

† The genus *Platypalpus* is separated from *Tachidromia* by Macquart, 'Diptères du Nord de la France.' *Platyp. Dolichop.* &c. p. 92.—E. Newman.

Leia nasuta (*Mycetophila id.*, C. 1173. 17[b]).

L. fusca abdomine albido-piloso; antennis basi pedibusque flavis; trochanteribus nigris, *m. f.* Long. $2\frac{1}{3}$—3 lin.

Not uncommon about rivulets at Holywood.

Add. Wings as in *Mycetophila*, fig. 21. (Meig. 1. pl. ix.) The face of the male is usually armed with a deflected horn or spine. There are three ocelli nearly in a line on the vertex, which determines its place in the genus *Leia*. *Mycetophila flavipes* of Macquart (S. a B. i. 130) seems nearly allied.

Limnobia Aegle, C. 1157. 37[c].

This is identical with *Idioptera pulchella* (*Limnobia id.* Meig. vi. 275. *Idioptera maculata*, Macq. S. a B. i. 94).

Spania Fallenii, C. 1203[b]. 2.—Ent. Mag. i. 162.

Notwithstanding the different form of the antennæ I am led to consider this as the female of *Sp. nigra*, which occurs more frequently in the same marshes in the month of June. The proboscis is longer in the females and the palpi not exactly linear. I have no longer any doubt as to the place of this genus among the *Leptidæ*.

Medeterus ruficornis, C. 1256. 5. App. 279.

M. obscure æneus, fronte thoraceque olivaceis; antennis brevissimis rufis margine apicis fusco; palpis pedibusque pallidis, tarsis fuscis; nervo transverso ordinario ab alæ margine remoto, *m. f.*; hypopygio recondito, *m.* Long. $1\frac{3}{4}$ lin.

Tarbert, July.

Dolichopus sabinus, C. 1258. 9[b]. App. 279.

D. ciliis genarum albidis; viridi-æneus antennis basi subtus rufis; pedibus pallidis, tarsis nigris basi pallidis; alarum costa exteriore infuscata, *m. f.*; tibiis posticis basi variolosis, femoribus imberbibus, lamellis albidis, *m.* Long. 2 lin.

Killarney and Tarbert.

Dolichopus signifer, C. 1258. 9[c] App. 279.

D. ciliis genarum albis; viridi-æneus femoribus apice tibiisque pallidis posticis apice nigris; alarum apice nigricante; *m. f.* femoribus posticis subtus fusco-ciliatis, lamellis albidis, *m.* Long. 2 lin.

On a sandy islet in Roundstone Bay.

Platypeza infumata, C. 1248. 14.

P. cæsia halteribus pedibusque fuscis, tarsis basi pallidis; thoracis macula tridentata atra; abdominis fasciis atris, duabus anterioribus confluentibus, *f.* Long. $\frac{3}{4}$ lin.

Holywood. I saw but lost a second specimen at Roe Park, county Derry.

Add. Wings pure hyaline, 5th nerve scarcely abbreviate, cross nerve near the margin. Hind tarsi much dilated at the base. The one I possess wants the head, and is otherwise injured, having probably been the prey of a spider.

Musca Morellia importuna, C. 1286. 21[b].
—— —— *hortorum*, C. 1286. 21.

Having been enabled by the kindness of Mr. F. Walker to consult Fallen's original description, I would rectify the distinction of these species. 1°. *M. hortorum.* To this belong Fallen's description, and my description of *M. importuna* (Ent. Mag. iv. 149), and probably all the *Morelliæ* described by Desvoidy. 2°. *M. importuna.* This is *M. hortorum* of Meigen and of my description in the Entomological Magazine.

Anthomyia monilis, C. 1287. 100[b] App. 279.

A. Homalomyia atra abdomine glauco-micante linea dorsali et incisuris atris; calyptris fumigatis; tibiis anticis basi pallidis, apice fasciculatis; tarsorum anticorum articulo ultimo orbiculato, *m.* Long. 2—2½ lin.

Very like *A. manicata*, but only half the size, and of a deeper black. Wings darker, calyptra smoky brown. Middle tibiæ scarcely incrassate at the tip; thighs of the same pair bearded throughout on the under side, and scarcely contracted before the tip. The tarsi are shorter, and the terminal joint in the fore pair round.

Not common at Holywood.

Anthomyia cilipes (*A.* 12-punctata, C. 1287. 139[b]. App. 279).

A. Azelia nigra oculis fulgidis, thorace postice cinereo, abdomine cinereo linea dorsali interrupta et punctis 2 in singulo segmento atris; alis fuliginosis; tibiis posticis extus longe villosis, *m.*; cinerea alis hyalinis, abdominis punctis paribus nigris, *f.* Long. 2½ lin.

Twice the size of *A. triquetra*, and very like it; but distinguishable by the darker wings, and still more by the hairy hind tibiæ of the male.

Very common about putrescent fungi.

Gen. Scatophaga. Subg. Halithea, C. App. 279.

Arista subnuda. Alæ unguiculatæ. Tarsi graciliores. Femora postica maris basi tuberculo villoso.

1. *Scatophaga fucorum,* C. 1293. 11.—*Fallen Scatom.* 5. 5.
S. H. obscure cinerea thorace lineato, antennis palpisque nigris.
2. *Scatophaga maritima,* C. 1293. 11[b]. App.—*Sc. fucorum, var.* Fallen, ibid.
S. H. obscure cinerea thorace lineato; margine frontis palporum basi tibiisque testaceis.

Both species are found on the sea coast, but not usually associated. The first is more rare or local.

Gen. Cœlopa, C. 1320.

This group will admit of subdivision, and the nomenclature of the species has been somewhat confused.

* Arista glabra. Facies et tibiæ densissime villosæ. *Cœlopa.*
1°. *C. pilipes. C. frigida,* Meig. vi. 8,—id. Macq. S. a B. ii. 502.
** Arista glabra. Facies et tibiæ setis aspersæ. *Fucomyia,* C. App. 280.
2°. *C. frigida. Musca id.* F. S. Antl. 307. 116. *Copromyza id.,* Fallen. *Heterom.* 6. 1. *Cœlopa gravis,* Ent. Mag. i. 167.
3°. *C. simplex,* Ent. Mag. ibid. 4°. *C. parvula,* Ent. Mag. ibid.
*** Arista villosa. Epistoma acute porrecta. *Malacomyza,* C. App. 280.
4°. *C. sciomyzina,* Ent. Mag. ibid.

Saltella sellata, C. 1297. 19.
S. nigra scutello aterrimo, antennis fuscis, coxis pallidis, *f.* Long. 1½ lin.
Holywood.

Perhaps a variety of *S. scutellaris,* fem.

Sepsis duplicata, C. 1297. 4[d]. App. 280.
S. nigra antennis pedibusque fusco-ferrugineis, alarum macula apicali obsoletiore, nervis 2° et 3° nervulo transverso connexis. Long. ⅘ lin.
Kent.

The extraordinary cross nerve is in a line with the ordinary one closing the discoidal cell.

Tephritis spoliata, C. 1300. 15[c]. App. 280.
T. Urophora nigella thoracis dorso cinereo, linea ante alas scutelloque flavis; capite genubus tarsorum basi ferrugineis; alis hyalinis puncto stigmaticali fusco, *m.* Long. 1⅓ lin.
Isle of Wight, June; F. Walker.

Remarkable for the absence of the bands general in the wings of this subgenus.

Tephritis Asteris, C. 1300. 35[b].

Resembles *T. sonchi,* and may prove a variety of that spe-

cies, with the sides of the thorax and the scutel yellow, the stigma of the wings lutescent, the costal margin without dusky streaks. Bred from puparia found among the seeds of *Aster Tripolium.*

Tephritis pini, C. 1300. 25[b].

T. Acinia cinerea capite pedibus et segmentorum anteriorum marginibus ferrugineis; alis fusco-reticulatis, maculis 2 costalibus saturatioribus. Long. 2 lin.

I find this upon pines, but have no knowledge of the larva. It may be a variety of *T. flavicauda.*

Oscinis capreolus, C. 1345. 41[b]. App. 282.

O. nigra nitida, fronte opaca triangulo nitido; alis fuliginosis; halteribus fuscanis; arista crassa dense plumata.

Resembles *O. lævigata,* but the arista as in *O cornuta.*

England; F. Walker.

Oscinis rapta, C. 1345. 41[d]. App. 282.

Resembles *O. pallidiventris,* but the discoidal cell of the wings is open by the absence of the ordinary cross nerve.

England; F. Walker.

Gen. Helomyza. Subg. Æcothea, C. App. 280.

Antennæ articulo tertio orbiculato, arista gracillima longa nuda. Tibiæ mediæ spinosæ. Alæ costa distincte serrata, areola mediastina minuta.

H. fenestralis is the only British species.

Helomyza arenaria, C. 1328. 34, is the same as *Opomyza maculata,* Macq.

Sciomyza virgata, C. 1321. 1. bis. App. 280.

S. Melina thorace cinerascente; fronte antennisque ferrugineis; pedibus pallidis, anticis apice fuscis, *m. f.*; abdomine pallido vitta dorsali interrupta cinerea, *m*; abdomine fusco incisuris pallidis, *f.* Long. 2—2½ lin.

Obs. The naked arista of this species should be particularly observed.

South of Ireland, July.

Gen. Sciomyza. Subg. Anticheta, C. App. 280.

Arista plumata. Tibiæ cilio præapicali gemino.

The type of this group is *Tetanocera vittata,* Ent. Mag. i. 168.

Ochthiphila flavipalpis, C. 1336. 6. App. 281.

O. elongata cana antennis subtus palpis tibiis tarsisque flavis, *m. f.*; metatarso postico subincrassato, *f.* Long. 1¼—1¾ lin.

On sandhills along the east coast of Ireland, among the stems of the sea reed; May—August.

Ochthiphila geniculata, C. No. 5. ibid.

O. cana antennis palpis pedibus nigris, genubus flavis, *m. f.*; abdomine qudrifariam nigro-punctato, *f.*; bifariam obsoletius punctato, *m.* Long. $1\frac{1}{3}$ lin.

On grassy slopes of the Sugar-loaf mountain, county Wicklow, May.

Gen. HETERONEURA. Subj. CLUSIA (Cleora, C. App. 282.)

Tibiæ cilio præapicali nullo. Alarum nervi transversi subremoti.

Sp. 1. *H. flava Heteromyza flava*, Meig. vi. 46. *Heteroneura spurca*, Ent. Mag. i. 171.

Gen. OPOMYZA. Subg. TETHINA, C. App. 281.

Facies impressa, epistomate prominulo nudo. Peristoma elongatum. Labium cylindricum bigeniculatum. Antennæ brevissimæ articulo 3° suborbiculato arista gracili subnuda. Alæ apice rotundatæ: nervus transversus ordinarius ab alæ margine distans.

Opomyza illota, C. 1338. 27. App. 281.

O. Tethina canescens fronte antennisque ferrugineis, facie palpis tarsis halteribus albidis, alis albis, *m. f.* Long. $\frac{3}{4}$—1 lin.

Somewhat like *Oscinis* (*Siphonella*) *albipalpis.*

In the flowers of *Cakile maritima* and *Convolvulus soldanella*; Killiney Bay, county Dublin; June.

Gen. DIASTATA. Subg. CAMILLA, C. 1337^{b}. App. 281.

Tibiæ cilio præapicali nullo. Antennæ decumbentes facie breviores, articulo 3° oblongo, arista pectinata. Labium incrassatum.

D. glabra. Drosophila id. Fall., Geom. 8. 12. *Diastata ærata*, C. App. 281.

Blarney, in July; also in England; F. Walker.

Obs. This species, though arranged under *Drosophila* by Fallen and Meigen, wants the most prominent characteristics of that genus, viz. the hirsute eyes and serrate caudal plates. I have therefore referred it to *Diastata.*

Sphærocera scabricula, C. 1350. 3^{b}. Ent. Mag. iii. 320.

Having lately met with this species in abundance, I find that the specimens from which my description was drawn were pale-coloured from immaturity; but the form of the head and hind tarsi, the wings and the white arista will characterize the species beyond mistake.

Limosina arcuata, Macq. C. 1350, 23[c].

Previously described by Fallen under the name *fontinalis*, Suppl. 16.

The new species of the *Hydromyzidæ* indicated in the Guide will be noticed in a more general memoir on that tribe.

Hemiptera.

Atheroides, C. 1046[b].

Corpus apterum lineare deplanatum, abdominis segmentis intermediis connatis, spiraculis penultimi simplicibus. Antennæ dimidio corpore breviores, 6-articulatæ, articulo ultimo capillaceo attenuato. Promuscis thorace brevior, mesosterni sulco incumbens. Femina vivipara.

Atheroides serrulatus, C. 1046[b]. 1.

A. rugulosus subglaber, capitis et segmenti ultimi marginibus denticulatis setosis, *m. f.* Long. 1 lin.

On grasses; common in autumn on the sea-coast at Holywood.

Atheroides hirtellus, C. 1046[b]. 2.

A. nitidus dorso undique hispidus, antennis pedibusque vage pilosis, *f.* Long. 1 lin.

On *Juncus articulatus*, Holywood.

Eriosoma pallida, C. App. 279.

This species, like *E. ulmi-gallarum*, inhabits the leaves of the mountain elm; its follicles are more solid and imbedded in the leaves near the base of the midrib, not elevated on a foot-stalk. The apterous female is white. The follicles burst about the beginning of August. The society is then very numerous, and the farinose secretion more abundant than in the former species. The winged insects are glossy bluish black, with the legs rather paler: collar dirty yellow, with a dusky transverse line: a row of lateral dots on the abdomen and its underside are greenish yellow, as also the promuscis. The nervures of the upper wings nearly as in *E. ulmi-gallarum*, but the lower have two nervures (in place of one) springing from the subcostal. The joints of the antennæ are of different proportions, the sixth being rather longer than the fifth.

Obs. The genus *Eriosoma* of Leach was made up of very different forms. Several groups have been already distinguished, viz. 1°. *Phylloxera*, Fonsc. If the minute species with incumbent wings which occurs on the oak (noticed by Walker, Ent. Mag. iii. 407) be the *Phylloxera roboris*, the de-

scription and figures of that species in the Annals of the Ent. Soc. Paris, are very inaccurate. 2°. *Myzoxyle,* Blot. 3°. *Adelges,* Vallot. Of this we have two species, *A. Laricis,* Vallot, and *A. gallarum abietis,* DeG.; at least I have found no cause for generic distinction in the structure, notwithstanding the difference of their habitation. If *Eriosoma Fagi* be assumed as the type of this genus, it will be necessary to separate those species which inhabit closed follicles on the leaves and shoots of plants. In that case I would propose the generic name *Byrsocrypta* for these last.

XXIII.—*On the Formation of the Fibre-formed Cells (Fibrous Cells) or Tubes of the Liber in Plants.* By Dr. J. Meyen*.

While engaged last winter with Prof. Mitscherlich in making a series of observations on the chemical composition of various vegetable substances, the following curious fact attracted our notice: that the purified fibres of flax, and also old linen, when boiled in muriatic acid, decomposed more or less suddenly into very minute shining particles, which soon settled at the bottom of the fluid. On examining them with the microscope, these particles appeared to be nearly of the same length, and to be formed by a regular decomposition of the flax fibres, so that each particle consisted of a small portion of the cylindrical or prismatical tubes of the flax fibre. Some portions were at times considerably longer; but then it was more or less evident that these also were composed of several small ones, which were similar in length to the former. At times, however, even the various layers of the thick membrane of which flax fibre is composed were separated from each other by the action of the boiling muriatic acid.

The examination of a thin unsized linen paper, which had been reduced, by continual boiling in water, to a pulpy mass, exhibited in like manner a manifold division of the single flax fibres into smaller particles, and of their walls into distinct layers: but this subdivision, on which the fabrication of paper evidently depends, was far from being comparable with the

* Translated from Wiegmann's Archiv, Part IV., 1838.

above-described perfect, and almost regular subdivision produced by the action of boiling muriatic acid.

Recent examinations into the development of buds have shown me that that cellular layer which is subsequently developed into tubes of the liber and so-called ligneous fibre, and extends as an uncoloured zone from above the medullary cone to the nucleus or rudiment of the bud, consists of extremely delicate, rather extended, prismatic, generally 4-, 5-, or 6-sided parenchymatous cells, which stand with their ends accurately one above the other, and are gradually converted by the absorption of their septa into the long fibrous cells or tubes of the liber. The regular abrupt cylindrical tubes into which the fibres of flax were decomposed by boiling in muriatic acid, are almost exactly of the same length as these tender parenchymatous cells in their fully developed state; and that the latter originate from the delicate cells of the medullary substance by gradual extension, may easily be observed in the terminal buds of the horse-chestnut and of the ash.

On the absorption of the septa of those cells, the superposed edges grow so intimately together that their union has not hitherto been observed, and the tube thus originated forms the first or fundamental layer of the membrane of the fibrous cell, the thickening of which follows as usual by deposition of new layers on the inner surface. I am induced to publish these short notices at present, as they may afford some indications tending to explain the origin of the fibres of the muscles and nerves of animals; at the same time I would recommend a careful attention to the spiral formations which muscular fibre exhibits often quite as plainly as the tubes of the liber. It also appears to me that distinct layers are perceptible in the membrane of the muscular fibre of fish.

XXIV.—*On some new Organic Remains in the Flint of Chalk.* By the Rev. J. B. Reade, M.A., F.R.S. With Plates VIII. and IX.

It is now very generally admitted that a geologist is as much in need of a microscope as of a hammer. Instruments of the latter class may indeed be sufficient for the exhumation of the

gigantic remains of Tilgate Forest; but accurately to follow out the workings of an Omnipotent agent, and to explore what may be justly termed the secret things in the kingdom of nature, puts into requisition the talent of our ablest opticians. Were any proof of this assertion necessary, it would more than suffice to refer, on the one hand, to the thousands of microscopic bodies which Mr. Lonsdale has discovered in chalk, or to the infinitely greater number of far more minute forms which Prof. Ehrenberg has discovered in the siliceous earths; and, on the other hand, to bear in mind that the results of the latter distinguished philosopher have set at rest the many unsatisfactory theories respecting the formation of the siliceous nodules of the chalk, and have naturally led to the conjecture, that, "as the formless cement in the semiopal of Bilin has been derived from the decomposition of animal remains, so also even those parts of chalk flints in which no organic structure can be recognised may nevertheless have constituted a part of microscopic animalcules."

A series of microscopic observations upon the ashes of plants which were commenced in the spring of 1837, led me, by steps heretofore stated in a communication to the British Association*, to examine into the condition of silica generally; and I not only can bear testimony to the accuracy of Prof. Ehrenberg's conclusion, that to a very great extent the organic remains of Infusoria swell the amount of solid matter of the crust of the earth, but I am able also to prove by careful experiments, that in plants certainly, and therefore probably in animals, the living principle is endowed with the power of elaborating out of their proper nutriment the solid materials or frame-work of their support. And hence the origin, and in the present day the increase both of silica and lime.

With respect to the agency of animalcules secreting carbonate of lime, it may be observed, that a thin transparent section of the Sussex marble shows in the most satisfactory manner, that the mouths of the *Paludinæ*, instead of being filled up with indurated marl, as was once supposed, abound with the remains of *Cyprides*, and that, in point of fact, the entire mass of the marble is nothing more than an aggregation of these

* Seventh Report. Transactions of the Sections, p. 103.

infusoria interspersed with the larger univalve. That the apparently inorganised particles are derived from the decomposition of the *Cypris* will scarcely be doubted, and to what extent each individual is capable of yielding a supply of calcareous matter is easily ascertained by incinerating recent examples. For it thus appears, that not only is there an indestructible though slender shell covering the body properly so called, but the delicate branches of the rami or arms inserted on each side of the head, as well as the arms themselves, are equally supplied with a frame-work of solid matter.

But my present object is to allude more particularly to some of the fossil contents of flint pebbles and of the flint nodules of chalk. It is now well known that flint of every kind is rich in organic remains, and few persons who use the microscope at all, have neglected the examination of these minute forms which had their little moment of life and enjoyment in ages of the most remote antiquity. Perhaps, however, it is not so generally understood, that in the hands of a skilful geologist a promiscuous series of flint pebbles would be assigned, with the utmost precision, and by means of their fossil contents alone, to their proper periods and strata. Yet such is the fact, and I have had the pleasure of seeing it verified by my friend Mr. Bowerbank, who lately took advantage of a geological tour to establish this curious result. I had, indeed, myself suspected that the flint of different strata had not a common origin, in consequence of the absence of the *Xanthidium* from many of the pebbles of the Brighton beach*. This highly interesting animalcule, of which several species occur in the flint of Kent and Surrey, I discovered first of all about a year ago in the flint of the Sydenham gravel; and this specimen was compared and identified with a French one, then but just imported at an expense exceeding 20 francs. I learnt on that occasion that Prof. Ehrenberg had already named and described this new fossil genus, and to him I am indebted for the names of the species which accompany this paper. Of the beauty of the drawings it is unnecessary to speak, and their

* One of these pebbles abounds with remarkably fine examples of *Pyxidicula*, and its crystalline state, by no means common to flint nodules, is decidedly proved by its action on polarized light.

accuracy is secured by the image of the objects having been thrown on paper by means of a Camera eye-piece, and then carefully traced. At the same time I cannot but observe that a magnifying power of 1000 linear, together with Ross's fine adjustment, gives a reality which no drawing can impart. We can trace our way down the arms, and penetrate what, comparatively speaking, appears to be a vast sphere, since it is no exaggeration to say that it would require nearly a thousand million individuals to fill up the image thus presented to the mind.

As to the manipulation of the flint, in order to prepare it for the stage of the microscope, the readiest method by far is to break a large nodule in half, and from the flat faces to chip off thin fragments, which may be attached by means of Canada balsam to slips of glass of the usual form, and then coated on their outer surface with hard spirit varnish. A hundred specimens may be thus cut, mounted, and polished, without trouble or expense, and in less time than an expert lapidary could prepare a single slice with the diamond-mill and polishing tool.

It is the received opinion among geologists, that the nature of the strata of the chalk, and the organic remains which they inclose, prove that the chalk was deposited in the tranquil depths of an extensive and profound ocean. This conclusion is rendered probable by the chambered *Nautili* and microscopic Foraminifera of flint, and it will derive additional force from a recent very interesting discovery of scales of fossil fishes, of great variety of form and in a state of most delicate preservation, throughout the entire series of the flint nodules both of the chalk and gravel, from Gravesend to Rochester and Gillingham*. A few weeks ago a single scale was discovered by Mr. Darker upon a fragment of flint which he had selected for a supply of the *Xanthidium*, but as he was ignorant of its locality he made no further search for similar remains: shortly afterwards a pebble was brought to me for my usual mode of examination, and upon its surface, I accidentally discovered the second scale, and had the advantage of knowing that I could apply to an inexhaustible store.

* The rolled flints of the Norfolk gravel-beds also abound with fossil scales.

These two specimens were exhibited to Prof. Ehrenberg during his visit in London, to whom, as to other observers, they were previously unknown. That they should so long have escaped our notice is to me a marvel, and I can only account for it, by making what I feel to be the very extravagant supposition, that the flints hitherto examined did not contain them. They are not like the infusoria, requiring great amplification to be rendered visible at all, but possess, in many cases, all the brightness, and more than half the magnitude, of a silver penny; and I am even tempted to ask how our geological sportsmen can have overlooked them; for of the only half dozen gun-flints which have ever been in my possession, I find a brilliant scale sparkling upon the surface of one of them. However, it is now a matter of certainty that we shall all find them, and in great numbers.

The value of this discovery in a geological point of view cannot be better stated than in the following extract from Prof. Phillips's 'Treatise on Geology'*: "M. Agassiz has proved the importance of the indications afforded by the nature of the dermal covering, and applied it to the classification of fishes with peculiar success. Instead of the divisions usually adopted from the nature of the skeleton,—cartilaginous and osseous fishes,—he distinguishes four great orders of fishes *from the nature of their scales,* and finds that with these differences of scales other great and important distinctions harmonize; but that the possession of a bony or cartilaginous skeleton is a question of comparative unimportance. The abundance and perfection of scales of fishes in a fossil state render this view, valuable as it is in recent zoology, absolutely essential to a study of the fossil kingdom; for thus *a few scales remaining, may lead to a knowledge of the species or genera belonging to each epoch,* and as portions of fishes are found in every one system of strata, from the ancient silurian to the most recent of lacustrine deposits, we are presented with a *second scale of organization* nearly as complete and as distinctly related to *time,* higher in the ranks of creation, and therefore *more sensibly dependent on physical conditions* than

* Cabinet Cyclopædia. Phillips on Geology, p. 88.

the well-known and justly valued series of remains of mollusca.

"The orders of fishes, according to their scaly coverings, are four; viz.

"1st. *Scales enamelled.*

"Placoid fishes, whose skin is *irregularly* covered with large or small plates, or points of enamel, as the rays and sharks* (Etym. πλαξ, a broad plate) occur recent, and numerous in the fossil state, being found in nearly all the systems of strata, though the genera are mostly peculiar in each system.

"Ganoid fishes are *regularly* covered with annular thick scales, composed internally of bone, and externally of enamel, generally smooth and bright (Etym. γανος, splendour). Occur recent, but more abundantly in the fossil kingdom, in which fifty extinct genera have been recognized.

"M. Agassiz appears to have ascertained that the strata below the cretaceous rocks contain very few, *if any*, other fishes than such as are included in these orders.

"2nd. *Scales not enamelled.*

"Ctenoid fishes have their scales of a horny or bony substance, without enamel; serrated or pectinated on the free posterior margin (whence their name, from κτεις, a comb).

"Cycloid fishes have smooth horny or bony unenamelled scales, entire at the posterior margin, with concentric or other lines on the outer surface (Etym. κυκλος, a circle).

"To the last two orders with unenamelled scales belongs by far the greater proportion of existing species of fish, which, according to Cuvier, exceeded 5000, but are stated by M. Agassiz to amount to 8000. On the contrary, the greater num-

* A small shark, taken a few years ago near the island of Trinidad and now in my possession, has the scales arranged over every part of the body and fins with the utmost regularity. They are somewhat oval in form, the larger diameter being $\frac{1}{80}$th and the smaller $\frac{1}{100}$th of an inch. Three equidistant ribs strengthen this delicate tissue, and project beyond the posterior margin similarly to the ribs of the scale represented in plate viii. No. 25. —J. B. R.

ber of fossil fishes belong to the two orders with enamelled scales."

It will be evident from an inspection of the plates, that the scales now described, with the exception of those represented at Nos. 2, 6, and 25, belonged to fishes of the last two orders, or those with unenamelled scales, indicating therefore an approximation to existing species; and the extraordinary similarity in general characters between the fossil and recent scales will at once be apparent from a comparison of the respective drawings. The latter were very obligingly supplied to me by Mr. Yarrell out of his private and unpublished collection, and are from the pencil of Mr. Charles Curtis. The former I traced under the microscope with a power of about 25 linear, and they were reduced and lithographed by Mr. Aldous, who is making larger drawings to preserve their relative proportions.

These scales vary in size from $\frac{3}{10}$ths to $\frac{1}{20}$th of an inch in diameter,* and are arranged in the order of their magnitude. The concentric lines, which vary with the age of the fish, are the most numerous on No. 10, being nearly 100, whereas there are about 14 only on No. 27. In Nos. 3. 12. 19. there are between 40 and 60. A recent scale in Mr. Yarrell's collection, which measures $8\frac{1}{2}$ inches in circumference, has upwards of 300 concentric circles. The fish from which this scale was taken is of the genus *Chatœssus*, Cuv.†, and is now in the British Museum. The row of scales along the sides of fishes, forming the well-known lateral line, in addition to the structure common to the scales of the other parts of the body, are pierced through near the centre by a tube which allows the escape of the mucous secretion, produced by the glands beneath. Each of the scales represented in Nos. 4. 12. 14. 18. exhibits this tube with the numerous lines peculiar to the species. It is here no doubt that we are to look for scales possessing the most decided specific characters, for, as I learn from Mr. Yarrell, who has gone into much detail upon this subject which he has not yet made public, though scales of the same fish differ in

* The largest scale I have as yet found is similar to No. 2, and measures $\frac{6}{10}$ths by $\frac{4}{10}$ths of an inch. Very fine examples of coniferous wood occur also in these flints.

† Règne Animal. Edition 1829, vol. ii. p. 320.

size, and even to a certain extent in form, yet a given series of scales from the lateral line, exhibiting a marked difference in structure, would undoubtedly indicate a corresponding series of species or genera.

That scale, for such I am now disposed to class it, which is represented at No. 13, has given me the most trouble to decipher. It has, at first sight, the appearance of a tooth, but it differs from that of a shark, to which, were it a tooth, it would be the most nearly allied by the great length of the fangs. And indeed there are no instances of teeth being thus let into the jaw; for they are either immoveable and to be considered as parts of the bone, or if moveable they are fixed to the skin. The subject in question, I believe to be the triple subcutaneous insertion of a ventral spine or quasi-scale of a fish nearly allied to the *Diodon orbicularis*, or porcupine fish of the present period. This similarity no sooner occurred to me than I immediately boiled a small portion of a *Diodon* in order to separate the triple-fanged insertion of a spine from its investing cartilage, and the only reason of my not figuring the latter example is the very satisfactory one of there being no difference except that of size to describe.

I find also with the scales, traces of ribs and fins, small sharp-pointed teeth, and parts of the vertebræ, and in a few instances I have found portions of the body with the scales *in situ*. But here I close this short account of an investigation which no right-minded man will prosecute without directing his thoughts to Him who of old "turned the hard rock into a standing water, and the flint-stone into a springing well."

Peckham, October 5, 1838.

XXV.—*Descriptions of British* Chalcidites. By Francis Walker, F.L.S.

[Continued from vol. i. p. 454.]

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, mediocre, subquadratum, convexum, punctatum, parum nitens, latitudine thoracis; vertex sat latus; frons abrupte declivis: oculi mediocres, subrotundi, non extantes: ocelli 3 triangulum fingentes, medius perparum antepositus: antennæ subfiliformes, latæ, pubescentes, thorace vix breviores; articulus 1us sublinearis, validus; 2us longicyathiformis; 3us et sequentes latiores, oblongo-quadrati, usque ad 6um curtantes; clava fusiformis, acuminata, articulo 6° plus dimidio longior vix latior: thorax longiovatus, convexus: prothorax transversus, sat bene determinatus, antice an-

gustus, postice concavus: mesothoracis scutum transversum; parapsidum suturæ bene determinatæ; paraptera et epimera magna, conspicua, subtrigona; scutellum breviovatum, læve; metascutellum transversum, breve: metathorax mediocris: petiolus brevis, crassus: abdomen ovatum, læve, thorace brevius, supra planum, subtus convexum; segmentum 1um magnum; 2um et sequentia brevia, parallela, subæqualia: sexualia exerta: pedes mediocres, recti, simplices, pubescentes, subæquales; tarsis articulus 1us 2° vix brevior, 3us 1° brevior, 4us 2° paullo longior: ungues et pulvilli sat magni: alæ mediocres, pubescentes, non ciliatæ; proalis nervus solitus setosus, humeralis ulnari multo longior, cubitalis radiali multo brevior ad alæ apicem tendens, apice stigma minutum fere integrum fingens; metalis nervus costalis simplex.

Sp. 27. Cirr. Articas, Mas. *Ater fulvo-varius, antennæ nigræ, pedes fulvi, alæ sublimpidæ.*

Ater: caput ad os flavum: oculi et ocelli rufi, illi antice flavo semicincti: antennæ nigræ; articulus 1us subtus fulvus: gula fulva: thorax subtus fulvus: prothorax postice viridi-fulvo fasciatus: mesothoracis parapsides fulvæ antice nigro-piceæ, scutellum fulvum basi nigro-piceum, paraptera et epimera fulvo-varia, postscutellum fulvum: petiolus fulvus: abdomen subtus ferrugineum; segmenta 1um et 2um apice supra æneo-ferruginea: sexualia picea: pedes fulvi; coxæ basi piceæ; tarsi supra picei; profemora extus piceo-vittata: alæ sublimpidæ; squamulæ fulvæ; nervi fusci. (Corp. long. lin. 1—1$\frac{1}{4}$; alar. lin. 1$\frac{1}{2}$—1$\frac{3}{4}$.)

Var. β.—Mesothoracis scutellum nigrum, apice fulvum: petiolus piceus: abdomen supra omnino nigrum.

Var. γ.—*Var.* β. similis: thorax supra ater: mesothoracis parapsides postice fulvæ: mesofemora piceo-vittata.

Var. δ.—*Var.* β. similis: meso- et metatibiæ fuscæ; tarsi nigro-picei.

July to September; near London, Isle of Wight.

Mas. Corpus breve, nitens, scitissime squameum, parce hirtum: caput transversum, subquadratum, sat magnum, convexum, punctatum, parum nitens, thorace paullo latius; vertex latus; frons abrupte declivis: antennæ subfiliformes, graciles, thorace multo longiores; articulus 1us sublinearis; 2us longicyathiformis; 3us et sequentes longi, lineares, usque ad 6um curtantes; clava fusiformis, acuminata, articulo 6° multo longior: thorax ovatus, convexus: prothorax transversus, bene determinatus, antice angustior: mesothoracis scutum transversum, breve; parapsidum suturæ bene determinatæ; paraptera et epimera magna, subtrigona; scutellum breviovatum, læve; metascutellum conspicuum: metathorax bene determinatus: petiolus brevis, crassus: abdomen planum, fere conicum, thorace multo brevius; segmentum 1um magnum, dorsi fere dimidium occupans; 2um et sequentia brevia, parallela, subæqualia: pedes graciles, simplices, recti, subæquales; mesotibiæ subclavatæ; tarsis articuli 1us et 3us breviores, 2us et 4us longiores; ungues et pulvilli sat magni: alæ pubescentes, non ciliatæ; nervus humeralis ulnari longior, cubitalis in alæ discum declivis radiali multo brevior, apice stigma fingens minutum fere integrum.

Sp. 28. Cirr. Acesius, Mas. *Luteus nigro-varius, antennæ piceæ, pedes flavi piceo-cincti, mesotarsi fusci, alæ subflavescentes.*

Luteus: caput nigrum: oculi et ocelli picei: antennæ nigro-piceæ; articuli 1us et 2us lutei, hic basi et ille apice supra picei: prothoracis discus nigro-piceus: mesothoracis scutum basi nigro-piceum, parapsides flavæ, scutellum paraptera et epimera nigra: metathorax niger: petiolus piceus, apice luteus: abdomen nigrum, basi luteum: sexualia flava: pedes flavi; tarsi apice fusci; propedum femora extus nigro-picea, tibiæ apice fuscæ; mesopedum tibiæ apice nigro-piceæ, tarsi fusci: alæ subflavescentes; squamulæ fulvæ; nervi fulvi. (Corp. long. lin. $\frac{2}{3}$—$\frac{3}{4}$; alar. lin. 1—$1\frac{1}{4}$.)

Var. β.—Mesothoracis scutum omnino luteum; scutellum rufum, discus piceus: abdomen basi ad medium luteum.

Var. γ.—Abdomen basi nigrum; segmenti 1i discus rufus.

Var. δ.—*Var.* β. similis: mesothoracis scutellum omnino rufum.

Var. ε.—*Var.* δ. similis: protibiæ omnino flavæ.

Var. ζ.—Petiolus omnino luteus.

Var. η.—Mesothoracis scutum piceum, parapsides rufæ, basi piceæ.

Var. θ.—Thorax supra omnino nigro-piceus.

June to September; near London. Ireland, Mr. Haliday.

Mas. Corpus sublineare, nitens, sublæve, parce hirtum: caput transversum, mediocre, subquadratum, convexum, punctatum, parum nitens, thoracis latitudine; vertex latus; frons subimpressa, abrupte declivis: antennæ filiformes, graciles, corpore vix breviores, pilis longioribus vestitæ; articulus 1us sublinearis; 2us longicyathiformis; 3us latus, oblongus; 4us et sequentes longi, lineares, usque ad 7um curtantes; clava longifusiformis, acuminata, articulo 7° multo longior: thorax longiovatus, convexus: prothorax transversus, brevis, conspicuus, postice incurvus: mesothoracis scutum magnum, latitudine longius; parapsidum suturæ conspicuæ, postice mutuo accedentes; paraptera et epimera bene determinata; scutellum obconicum; metascutellum brevissimum: metathorax conspicuus: petiolus brevissimus, crassus: abdomen longiovatum, subglabrum, supra planum, thorace paullo angustius vix brevius; segmenta 1° ad 3um magna, 4um et sequentia brevia parva: pedes graciles, simplices, recti, sat longi; tarsis articuli 1° ad 3um subæquales, 4us 3° longior; ungues et pulvilli mediocres: alæ breviter ciliatæ; nervus ulnaris humerali non brevior, radialis vix ullus, cubitalis in alæ discum declivis apice stigma fingens fere integrum.

Fem. Caput thorace paullo angustius: antennæ clavatæ, thorace non longiores; articulus 3us brevissimus; 4us fusiformis; 6us et 7us breviores; clava longiovata, acuminata, articulo 7° multo longior: abdomen longiovatum, apice acuminatum, thorace latius et paullo longius; segmenta transversa, parallela, 1um magnum, 2um et sequentia parva.

Sp. 29. Cirr. Armæus, Mas et Fem. *Niger flavo-varius, antennæ nigræ, pedes fulvi piceo-vittati, alæ subfulvæ.*

Fem. Niger: caput antice et circum oculos flavum: oculi et ocelli picei: antennæ nigræ; articulus 1us basi flavus: mesothoracis scutum apice et basi utrinque flavo marginatum, paraptera et epimera partim flavo marginata,

scutellum et postscutellum flava, illum piceo utrinque breviter vittatum et medio maculatum; abdomen æneo-atrum: pedes fulvi; coxæ piceæ; tarsi apice picei; profemora basi extus piceo-vittata; mesofemora basi fusco plagiata; metafemora nigro-picea, apice fulva: alæ fulvescentes; squamulæ fulvæ; nervi fulvi.

Mas. Mesothoracis scutum apice piceo utrinque binotatum; pro- et metafemora fusca, apice fulva: mesofemora fulva. (Corp. long. lin. 1—1¼; alar. lin. 1½—1¾.)

Var. β. *Mas.*—Femora omnia fulva.

Var. γ. *Fem.*—Mesothoracis parapsides fere omnino flavæ, scutelli vittæ obsoletæ: abdominis segmenti 1i discus ferrugineus: metatibiæ pallide fuscæ.

Var. δ. *Fem.*—*Var.* γ. similis: mesothoracis scutelli macula fulva: metafemora fusca, apice fulva.

Var. ε. *Fem.*—Mesofemora fulva: metafemora pallide fusca, apice fulva.

Var. ζ. *Fem.*—Mesothoracis scutelli macula nigra, vittæ obsoletæ.

Var. η. *Fem.*—*Var.* δ. similis: mesofemora fulva; metatibiæ fuscæ.

June, September; near London, Isle of Wight, Wales, Scotland. On oaks, Tullymore Park, Ireland, Mr. Haliday.

Sp. 30. Cirr. Metra, Fem. *Ochraceus, antennæ fuscæ, abdomen æneo-nigrum, pedes fulvi, alæ limpidæ.*

Ochraceus: caput postice et ad ocellos nigro-piceum: oculi et ocelli rufi: antennæ fuscæ; articuli 1us et 2us fulvi, hic basi et ille apice fusci: thoracis suturæ piceæ: mesothoracis scutum antice nigro-piceum, scutellum piceo bivittatum: metathorax piceus: petiolus ferrugineus: abdomen æneo-nigrum, basi ferrugineum: pedes pallide fulvi; genua flava; ungues et pulvilli fusci: alæ limpidæ; squamulæ pallide flavæ; nervi concolores. (Corp. long. lin. 1; alar. lin. 1½.)

August; near London.

Fem. Corpus longum, sublineare, nitens, sublæve, parce hirtum: caput parvum, transversum, subquadratum, punctatum, parum nitens, thorace paullo angustius; vertex sat latus; frons impressa, abrupte declivis: antennæ graciles, clavatæ, thorace paullo longiores; articulus 1us sublinearis; 2us longicyathiformis; 3us brevissimus; 4us fusiformis, longus; 5us et 6us breviores; clava fusiformis, acuminata, articulo 6o multo longior: thorax longiovatus, convexus: prothorax transversus, conspicuus, angustus, postice incurvus: mesothoracis scutum magnum, latitudine longius; parapsidum suturæ conspicuæ, postice mutuo accedentes; paraptera et epimera bene determinata; scutellum subrotundum: metascutellum parvum, fere semicirculum fingens: metathorax conspicuus: abdomen longiovatum, thorace longius, supra planum, subtus carinatum, apice acuminatum et attenuatum, segmenta transversa, parallela, subæqualia: petiolus crassus, brevissimus: pedes graciles, simplices, recti, sat longi; tarsis articuli 1o ad 3um subæquales, 4us 3o longior; ungues et pulvilli mediocres: alæ breviter ciliatæ; nervus ulnaris humerali non brevior, radialis vix ullus, cubitalis in alæ discum declivis apice stigma fingens fere integrum.

Sp. 31. Cirr. Eurytus, Fem. *Viridis flavo-varius, antennæ nigræ, pedes flavi, alæ limpidæ.*

Læte viridis: caput antice et subtus flavum: oculi et ocelli rufi: antennæ nigræ; articulus 1us basi et subtus fulvus; 2us apice fulvus: thoracis discus cupreo-varius: mesothoracis scutum utrinque et postice flavo marginatum, paraptera et epimera flavo partim marginata, scutellum et postscutellum flava, illi macula ad basin trigona viridis: abdomen cyaneo-viride: pedes flavi; coxæ virides; ungues et pulvilli pallide fusci; protarsi fulvi: alæ limpidæ; squamulæ fulvæ, antice virides, nervi fulvi. (Corp. long. lin. 1; alar. lin. 1½.)

Found near London.

Fem. Corpus angustum, sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum; vertex sat latus; frons abrupte declivis, vix impressa: oculi mediocres, subrotundi, extantes: ocelli vertice triangulum fingentes: antennæ graciles, extrorsum crassiores, corporis dimidio longiores; articulus 1us fusiformis, 2us longiobconicus; 3us et sequentes lineares, ad 5um curtantes; clava fusiformis, acuminata, articulo 5° fere duplo longior: thorax ovatus, convexus: prothorax transversus, brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsides remotæ, suturæ bene determinatæ; scutellum obconicum; paraptera et epimera conspicua: metathorax mediocris: petiolus brevissimus: abdomen fusiforme, planum, acuminatum, thorace longius vix angustius; segmenta parallela, 1um magnum, 2um et sequentia breviora subæqualia: pedes graciles, sat longi, subæquales; tarsis articuli 1us et 3us breviores, 2us et 4us longiores; ungues et pulvilli parvi: alæ angustæ, ciliatæ; nervus ulnaris humerali longior, radialis nullus, cubitalis in alæ discum declivis stigma fingens parvum fere bimucronatum.

Sp. 32. Cirr. Mandanis, Fem. *Viridis cupreo-varius, abdomen basi ferrugineum, antennæ piceæ, pedes flavi, alæ sublimpidæ.*

Læte viridis, cupreo-varius: oculi et ocelli rufi: antennæ piceæ; articuli 1us et 2us fulvi, hic supra et ille apice fusci: abdomen viridi-cupreum, basi ferrugineum: pedes læte flavi; coxæ virides; tarsi apice fusci; protarsi fulvi, apice picei: alæ sublimpidæ; squamulæ fulvæ; nervi fulvi. (Corp. long. lin. ½—¾; alar. lin. ⅘—1¼.)

July; near London, Scotland.

Mas. Corpus nitens, læve, parce hirtum: caput parvum, transversum, brevissimum, convexum, thorace angustius; vertex angustus; frons impressa, abrupte declivis: oculi sat magni, subrotundi, extantes: ocelli vertice triangulum fingentes: antennæ subsetaceæ, graciles, pilis longioribus vestitæ, corpore multo breviores; articulus 1us sublinearis, gracilis; 2us longicyathiformis; 3us brevis; 4us et sequentes ad 7um lineares, subæquales; 8us et 9us sensim angustiores; 10us minutus, acuminatus: thorax ovatus, supra planus: prothorax transversus, brevissimus, antice angustior, supra conspicuus: mesothoracis scutum longitudine vix latius; parapsidum suturæ remotæ, conspicuæ; scutellum brevi obconicum; paraptera et epimera sat bene determinata: metathorax mediocris: petiolus brevis, gracilis: ab-

domen sublineare, depressum, fere glabrum, apice paullo latius, thorace angustius non longius; segmenta transversa, parallela, subæqualia: pedes graciles, simplices, subæquales; tarsis articuli 1us et 3us breviores, 2us et 4us longiores; ungues et pulvilli minuti: alæ ciliatæ: proalæ latæ; nervus ulnaris humerali paullo longior, radialis nullus, cubitalis longus in alæ discum declivis apice stigma fingens minutum fere integrum.

Fem. Antennæ 8-articulatæ, extrorsum crassiores, corporis dimidio longiores; articuli 3us, 4us et 5us lineares, subæquales; clava fusiformis, attenuata, acuminata, articulo 5° fere duplo longior: abdomen ovatum, acuminatum, subtus carinatum, thoraci fere quoad longum et latum.

Sp. 33. Cirr. Anysis, Mas et Fem. *Ater, abdomen antice flavum, antennæ fulvæ, pedes flavi, alæ limpidæ.*

Mas. Ater: caput flavum; vertex piceus: oculi et ocelli rufi: antennæ pallide fulvæ; articulus 1us flavus, supra fulvo-vittatus; 2us flavus, basi fuscus: abdomen piceum, ante medium flavo-fasciatum; segmentum 1um fuscum: sexualia fulva: pedes læte flavi; coxæ basi fulvæ; ungues et pulvilli fulvi: alæ limpidæ; squamulæ flavæ, antice fuscæ; nervi flavi.

Fem. Æneo-ater: antennis articulus 1us flavus; 2us pallide fulvus, basi fuscus: abdomen nigro-piceum; discus antice flavus; segmentum 1um basi fuscum: coxæ basi piceæ: alæ minime flavescentes. (Corp. long. lin. $\frac{1}{3}$—$\frac{1}{2}$; alar. lin. $\frac{2}{3}$—1.

Var. β. *Mas.*—Antennis articulus 2us basi fulvus: squamulæ antice fulvæ.

Var. γ. *Mas.*—Abdomen nigro-piceum, basi piceum, medium ante fulvo fasciatum: alis nervi fulvi.

Var. δ. *Fem.*—Abdominis dimidium anticum flavum; segmentum 1um basi fulvum: alis nervi fulvi.

Var. ε. *Fem.*—Antennis articulus 1us fulvus, apice flavus.

Var. ζ. *Fem.*—Antennis articuli 1us et 2us obscure fulvi: abdomen cuprco-piceum, ante medium flavo-fasciatum: alis nervi fulvi.

Found near London.

Mas. Corpus nitens, læve, parce hirtum: caput parvum, transversum, brevissimum, convexum, thorace angustius; vertex angustus; frons impressa, abrupte declivis: oculi sat magni, subrotundi, extantes: ocelli vertice triangulum fingentes: antennæ filiformes, graciles, pilis longioribus vestitæ, corpore multo breviores; articulus 1us sublinearis, gracilis; 2us longicyathiformis; 3us brevis; 4us et sequentes ad 7um lineares, subæquales; 8us et 9us sensim angustiores; 10us minutus, acuminatus: thorax ovatus, supra planus: prothorax transversus, brevissimus, antice angustior, supra conspicuus: mesothoracis scutum longitudine vix latius; parapsidum suturæ remotæ, conspicuæ; scutellum brevi-obconicum; paraptera et epimera sat bene determinata: metathorax mediocris: petiolus brevis, gracilis: abdomen depressum, fere glabrum, sublineare, apice paullo latius, thorace angustius non longius; segmenta subæqualia: pedes graciles, simplices, subæquales; tarsis articuli 1us et 3us breviores, 2us et 4us longiores: alæ ciliatæ; proalæ latæ; nervus ulnaris humerali paullo longior, radialis nullus, cubitalis in alæ discum declivis stigma minutum fingens.

Fem. Antennæ extrorsum crassiores, corporis dimidio longiores; articuli 3° ad 5um curtantes; clava fusiformis, attenuata, acuminata, articulo 5° duplo longior: abdomen ovatum, acuminatum, subtus carinatum, thoraci fere quoad longum et latum; segmentum 1um magnum, 2um et sequentia brevia, subæqualia.

Sp. 34. Cirr. Ecus, Mas et Fem. *Viridis, abdomen cupreum basi sæpe flavum, antennæ fulvæ, pedes flavi, alæ limpidæ.*

Fem. Læte viridis: oculi et ocelli rufi: antennæ obscure fulvæ; articuli 1us et 2us fusci, ille basi flavus: abdomen cupreum, basi fulvescens, apice viride: pedes læte flavi; ungues, pulvilli et protarsi fulvi: alæ limpidæ; squamulæ flavæ, antice fulvo variæ; nervi flavi.

Mas. Æneo-viridis: antennæ pallide fulvæ; articuli 1us et 2us fusci, hic apice fulvus: abdomen cupreum, basi flavescens, apice viridi-varium. (Corp. long. lin. $\frac{1}{2}$—$\frac{3}{4}$; alar. lin. $\frac{2}{3}$—1.)

Var. β. *Fem.*—Thorax cyaneo-viridis: abdomen medium ante flavo fasciatum: alis nervi flavi.

Var. γ. *Fem.*—Antennis articuli 1us et 2us pallide fusci, hic apice fulvus, ille basi flavus: abdomen antice flavum, postice cupreum.

Var. δ. *Fem.*—Mesothoracis scutellum viridi-cyaneum: abdomen cupreum, apice viride.

Var. ε. *Fem.*—Metathorax æneo-viridis: abdomen cupreum; segmenta apice viridia: alis nervi fulvi.

Var. ζ. *Fem.*—*Var.* γ. similis: antennis articulus 1us flavus, apice supra pallide fuscus.

July, October, near London.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, thorace latius: antennæ clavatæ, pilis longis vestitæ, corporis dimidio longiores; articulus 1us latus, longiovatus; 2us longicyathiformis; 3us et sequentes ad 6um breves, approximati, sublineares; clava longiovata, articulo 6° plus duplo longior et multo latior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen sublineare, planum, thorace brevius et angustius: pedes graciles: alis nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 35. Cirr. Euedochus, Mas. *Viridis, abdomen cupreum, antennæ flavæ apice fulvæ, pedes flavi, femora nonnunquam obscuriora, alæ limpidæ.*

Obscure viridis æneo-varius: oculi et ocelli rufi: antennæ læte flavæ; clava fulva, basi flava: abdomen cupreum: pedes læte flavi; coxæ virides, apice flavæ; meso- et metatarsi apice fulvi; protarsi supra pallide fulvi: alæ limpidæ; squamulæ flavæ, supra fusco notatæ; nervi flavi. (Corp. long. lin. $\frac{1}{3}$—$\frac{2}{3}$; alar. lin. $\frac{1}{2}$—1.)

Var. β.—Antennis articulus 1us cupreus; 4us, 5us et 6us supra pallide fulvi; clava obscurior: coxæ virides; trochanteres fulvi; pro- et mesofemora basi fusca; metafemora viridia, apice flava.

On the hazel, Holywood, near Belfast, Ireland, Mr. Haliday. Found near London.

Fem. Corpus longum, augustum, sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, thorace paullo latius; vertex latus; frons abrupte declivis: oculi mediocres: antennæ capitatæ, thorace paullo breviores; articulus 1us gracilis, fusiformis; 2us longicyathiformis; 3us, 4us et 5us sublineares, æquales; clava ovata, articulo 5° multo latior et plus duplo longior: thorax longiovatus, parum convexus: prothorax conspicuus, latitudine longior, antice angustus: mesothoracis scutum depressum, latitudine longius; parapsidum suturæ non bene determinatæ; scutellum obconicum: metathorax mediocris: petiolus brevissimus: abdomen longiovatum, depressum, apice acuminatum, thorace paullo latius vix longius; segmentum 1um magnum, 2um et sequentia brevia: pedes graciles, simplices, subæquales; tarsis articulus 1us brevis, 4us longus; ungues et pulvilli minuti: alis nervus ulnaris humerali longior, cubitalis sat longior, stigma parvum subfurcatum fingens; radialis brevissimus.

[To be continued.]

XXVI.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 132.]

RUBIACEÆ, (*Juss*).

(Opercularia, *A. Rich.*)

1. Opercularia, *Gærtn.*, *A. Rich.*

466. *O. diphylla*, foliis ———, capitulis ex dichotomia ramorum stipitatis sphæricis involucris setoso-hispidis in capitulo pluribus 3—4 floris, corollis tetrandris. *DC. Prodr.* iv. *p.* 616. *Gærtn. Rœm. et Sch. Syst. Veg.* iii. *p.* 337.—Rubioides diphylla. *Soland. Ms. in Bibl. Banks.*

New Zealand.—1769, *Sir Jos. Banks.*

467. *O. aspera*, foliis oblongis scabris venosis, floribus capitatis pedunculis axillaribus. *DC. Prodr.* iv. *p.* 616. *Spreng. Syst. Veg.* i. *p.* 385. *Gærtn. Rœm. et Sch. Syst. Veg.* iii. *p.* 334.—Rubioides aspera. *Sol. Ms. in Bibl. Banks.*

2. Galium, *L. Juss.*

468. *G. tenuicaule*, annuum, caule debili valde attenuato tetragono retrorsum aspero, foliis quaternis spathulato-oblongis acutis basi angustatis aculeato-scabris, pedunculis axillaribus subtrifloris, folium subæquantibus, fructibus globoso-didymis glabris.

New Zealand (Northern Island). Damp woods on the Keri-Keri and Waugaroa rivers.—1834, *R. Cunningham.*

469. *G. propinquum*, annuum, caule attenuato debili decumbente tetragono glabro membranaceo, foliis quaternis (4 lineas longis) ellipticis acutis petiolatis margine aculeato-hispidis, pedunculis axillaribus solitariis folio vix longioribus, fructibus glabris globoso-didymis minutim tuberculatis.

New Zealand (Northern Island). Shaded woods, Waugaroa.—1833, *R. Cunningham.*

Obs. This species approaches very near to *G. humile* (*Cham. et Schlecht. in Linnæa*, 1825, p. 226.) a native of South America, the fruit of which is, however, described as being pubescent. *DC. Prodr.* iv. p. 604.

Quid *Galium umbrosum, Sol. Ms. in Forst. Prodr. n.* 500, absque descr. ? ex Nova Zelandia.

3. Coprosma, *Forst.*

(Pelaphia, *Banks et Sol.*)

470. *C. lucida*; foliis ovatis utrinque acuminatis, pedunculis axillaribus compositis, floribus subcapitatis, antheris exsertis. *DC. Prodr.* iv. *p.* 578. *Forst. Prodr. n.* 138. *Rœm. et Sch. Syst. Veg.* vi. *p.* 210. *A. Rich. Fl. Nov. Zel. p.* 262. *Endl. Prodr. Fl. Norf. p.* 60.

New Zealand (Northern Island).—1773, *G. Forster.* (Middle Island), Bay of Islands, on the banks of rivers.—1826, *A. Cunningham.*

Obs. An species plures hic confusæ sunt ?

471. *C. fœtidissima*, foliis ovato-oblongis angustis confertis glabris, floribus solitariis terminalibus sessilibus (inter folia conferta) antheris exsertis. *Forst. Prodr. n.* 138. *A. Rich. Fl. Nov. Zel. p.* 261. *DC. Prodr.* iv. *p.* 578. *Rœm. et Sch. Syst. Veg.* vi. *p.* 210.—C conferta. *A. C. Mss.* 1826.

New Zealand (Middle Island). Queen Charlotte's Sound.—1773, *G. Forster.* (Northern Island,) Alluvial banks of rivers, Bay of Islands.—1826, *A. Cunningham.*

472. *C. propinqua*, foliis lanceolato-oblongis obtusissimis glabris, floribus solitariis paucis ad apicem ramulorum subsessilibus, ramis brachiatis virgatis strictis.

New Zealand (Northern Island). In shaded woods, Wangaroa.—1833, *A. Cunningham.*

Obs. Closely allied to the preceding, but the flowers are less crowded, and its leaves are smaller.

473. *C. rotundifolia*, foliis obovato-subrotundis obtusis subacuminatisve petiolatis subtus ramulisque virgatis pilosis, floribus axillaribus aggregatis pedicellatis.

New Zealand (Northern Island). In dry woods at Wangaroa, bearing "red drupæ."—Dec. 1833, *R. Cunningham.*

474. *C. rhamnoides*, foliis (parvis) obovato-rotundatis obtusis petiolatis glabris margine revolutis tenuissime ciliatis, petiolis ramulisque villosis, floribus axillaribus solitariis, ramis brachiatis rigidis patentibus dependentibus deflexis.

New Zealand (Northern Island). Banks of the Keri-Keri river.—1834, *R. Cunningham.*

475. *C. gracilis*, foliis (parvis) ovato-oblongis petiolatis obtusiusculis margine revolutis utrinque glabris, floribus axillaribus solitariis pedicellatis, ramulis erectis gracilibus villosis.

New Zealand (Middle Island).—1773, *G. Forster* (fide examplar absque fructificatione in Herbario Banks. conservatur). (Northern Island,) a slender shrub, in alluvial soil on the banks of the Keri-Keri river, &c., Bay of Islands.—1834, *R. Cunningham*, bearing red berries in December.

476. *C. divaricata*, foliis obovato-oblongis obtusis petiolatis glabris, floribus axillaribus solitariis breviter pedunculatis, ramis divaricatis rigidis, ramulis tomentosis.

New Zealand (Northern Island). Dry woods at Wangaroa.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

477. *C. acerosa*, foliis linearibus acerosis obtusis, fasciculatis lævibus margine revolutis floribus masculis axillaribus solitariis sessilibus tetrandris, ramulis strictis brevi tomentosis.—Pelaphia acerosa. *Sol. Ms. in Bibl. Banks.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Sandy rocks on the Hokianga, near the immediate shore.—1826, *A. Cunningham.* Sea coast, on the east side, opposite the Cavallos Isles.—1834, *R. Cunningham.*

Obs. Flores declives dioici. *Masculi* tetrandri. *Fœminei*, stylus bifidus, elongatus.

478. *C. repens*, (Rich.) caule frutescente prostrato, foliis obovalibus obtusis margine subsinuatis, pedunculis simplicibus axillaribus brevibus apice 3—5 floris, fructibus obcordatis. *A. Rich. Fl. Nov. Zel. p.* 264.—C. pusilla, *Sol. Forst. Prodr. n.* 513. *absq. descr.*

New Zealand (Middle Island). Cook's Strait and Astrolabe Harbour.—1827, *D'Urville.*

Obs. Frutex repens, prostratus. *Folia* opposita, obovalia, integra, glaberrima 2—3 pollicaria, margine subsinuosa basi sensim in petiolum vix pollicarem desinentia. *Pedunculi* axillares, solitarii. *Fructus* apice pedunculorum, 2—5, carnosi, binuculati, nucibus 1-locularibus, 1-spermis.

479. *C. spathulata* erecta, virgata, glabra, foliis subrotundis obtusis vel emarginatis, basi sensim in petiolum attenuatis, floribus solitariis, stylis longissimis.

New Zealand (Northern Island). Shady rocks, Wangaroa, &c.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

4. Ronabea, *Aubl., A. Rich. Mém. Soc. Paris*, v. *p.* 270.

Calyx tubus ovatus, limbus minimus 5-dentatus. *Corolla* oblonga subinfundibuliformis, lobis 5-petulis acutis, fauce nuda. *Antheræ* 5, oblongæ, inclusæ. *Stigma* bilamellatum. *Bacca* ovata umbilicata, fœta nucibus duabus 1-spermis hinc planis inde convexis. *DC.*

480. *R.? australis*, foliolis obovalibus obtusis basi sensim in petiolum attenuatis, pedunculis axillaribus trifurcatis, floribus sessilibus subcapitatis. *A. Rich. Fl. Nov. Zel. p.* 265.

New Zealand (Middle Island). Astrolabe Harbour.—1827, *D'Urville.*

Patété, incol., *D'Urville.*

Obs. Arbor sat grandis, dumosa, ramis teretibus, glabris. *Folia* opposita, subcoriacea, glaberrima, supra viridia, subtus pallidiora, 4—5 pollices longa, 2—3 lata. *Flores* 3—8 ad apicem pedicellorum sessiles congesti. *Fructus* distincti, ovoidei, pisiformes, subcarnosi, apice brevissime umbilicati, binuculati, nucibus 1-spermis.

"D'ailleurs le *Ron. australis* a de l'analogie avec une autre espèce nouvelle que nous avons désignée, dans notre travail sur les *Rubiacées*, sous le nom de *Ronabea morindoides*. Cependant le limbe du calice,

entier dans son bord, est un caractère qui ne s'est offert à nous dans aucune autre espèce du genre. Peutêtre que si nous avions pu étudier l'organisation des diverses parties de la fleur, nous eussions été porté à faire de notre plante un genre nouveau." *A. Rich.*

Affinis *Psychotriæ*, sed bacca non costata.

5. Nertera, *Banks in Gærtn. Fr. Juss.*

481. *N. depressa. DC.* iv. *p.* 451. *Forst. Prodr. n.* 501. *Smith Ic. Ined.* ii. *t.* 28.—Gomozia granadensis. *Mutis in Linn. Suppl. p.* 29.

6. Geophila, *Don, Prodr. Fl. Nep.* 136.
(*Psychotriæ, Sp. L.*)

Calyx 5-partitus, laciniis linearibus patenti-recurvis. *Corolla* tubulosa, fauces pilosæ lobis 5 ovatis subrecurvis. *Antheræ* 5 inclusæ. *Stigma* bifidum. *Bacca* ovoidea costato-angulata calyce coronata bilocularis disperma.

482. *G.? dichondræfolia*, hispido-pilosa, foliis (semiuncialibus) latissime ellipticis subreniformibusve cordatis acuminatis petiolum æquantibus, floribus —— fructibus subsessilibus solitariis terminalibus.

New Zealand (Northern Island). In dry woods on the shores of the Bay of Islands, at Waimaté, Hokianga, &c.—1834, *R. Cunningham.* "Bearing orange-coloured berries" in December.

I have been induced to refer this plant (clearly, I conceive,) of *Rubiaceæ* to *Geophila* of Don, as much from its habit, as from the structure of its fruit, reported to be an orange-coloured bacca.

7. Viscum, *L.*

483. *V. antarcticum*, ramis compresso-teretibus, ramulis ancipitibus, foliis oblongo-ovatis basi attenuatis petiolatis obtusis undulatis, enerviis, racemis, ramis axillaribus terminalibusve patentibus articulatis. *Forst. Prodr. n.* 370. *A. Rich. Fl. Nov. Zel. p.* 269. *DC. Prodr.* iv. *p.* 285.—Tupeia antarctica. *Schlechtend. in Linnæa*, ii. *p.* 203.

New Zealand (Middle Island).—1773, *G. Forster.* (Northern Island,) parasitical on *Avicennia tomentosa*, Br., on the banks of the Kana-Kana river. —1834, *R. Cunningham.*

484. *V. pubigerum*, ramis teretibus lævibus dichotomis, foliis elliptico-rhomboideis obtusis basi attenuatis venosis margine asperis, nervo medio ramulisque pubescentibus, floribus terminalibus lateralibusve umbellato-racemosis.

Tiran-riki, incol., *R. Cunn.*

New Zealand (Northern Island). Upon several trees on river banks, at the Bay of Islands. *A. Cunningham.*

485. *V. salicornoides*, aphyllum, ramosissimum, ramis teretibus articulatis, vaginis dilatatis.

New Zealand (Northern Island). Parasitical on *Leptospermum scoparium*, the *Kahikitra* of the natives, Keri-Keri river, Bay of Islands.—1834, *R. Cunningham.*

8. Loranthus, *L.*

486. *L. tetrapetalus, L. Forst. Prodr. n.* 156. *Schult. Syst. Veg.* vii. *p.* 60. *DC. Prodr.* iv. *p.* 295. *A. Rich. Fl. Nov. Zel. p.* 268.

New Zealand (Middle Island). Queen Charlotte's Sound.—1773, *G. Forster.* (Northern Island.) Parasitical on *Metrosideros tomentosa*, or *Pohntu-Kana* of the natives; is also occasionally on the branches of *Vitex littoralis*, their *Puriri*, in the forests of Wangaroa.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

Folia subpetiolata, opposita, ovalia, obtusa, erecto-patentia. *Flores* ex axillis vel cicatricibus foliorum oriuntur, pedunculati, sæpe solitarii, sæpe etiam bini, terni, quaterni, in singulo fasciculo, aurantio-coccinei.

9. Genus Corneis affine.

Alseuosmia.

Calycis tubus ovario adnatus, limbo supero 4—5-fido, deciduo, laciniis ovatis æstivatione valvata. *Corolla* infundibuliformis, tubo elongato calyce multoties longior, fauce imberbi-limbus 5-partitus regularis, laciniis ovatis acutiusculis, margine divisis sinuato-repandis peræstivatione valvata. Stamina 5, æqualia, brevia, ori tubi inserta et cum laciniis alterna. *Discus* epigynus. *Antheræ* ultra faucem exsertæ, biloculares, longitudinaliter dehiscentes: ovarium biloculare, loculis 2—5 ovulatis vel indefinitis. *Stylus* elongatus, filiformis, glaber, longitudine staminum. *Stigma* depresso-capitatum indivisum. *Bacca* turbinata, obovata, glabra, infera, 1-locularis, polysperma, aut interdum abortu oligosperma. *Semina* obovata, curvata, obtusa, latere exteriore convexa, interiore angulata, medio interiore umbilico instructa. *Testa* brunnea, lævis, crassa, rugulosa, pulchre reticulata. *Albumen* copiosum, carnosum. *Embryo* minutus, rectus, albumine 4—5ies brevior, dicotyledoneus, juxta basin albuminis. *Cotyledones* subfoliacei, sibi incumbentes. *Radicula* brevis, crassa, obtusa, ab umbilico remota. *Plumula* inconspicua. Frutices *erecti, sempervirentes*, 2—3 *pedales.* Folia *alterna, exstipulata, petiolata, oblonga, subintegra seu lobata.* Petioli *basi dilatata.* Flores *odoratissimi, pedicellati, bracteati, laterales seu terminales, solitarii aut fasciculati, subracemosi.*

Flores harum plantarum in sylvis natalibus suis, gratissimum late spirant odorem, unde nomen Generis, ex αλσος *lucus*, et ευοσμια *gratus odor.*

487. *A. linariifolia*, foliis (uncialibus) lineari-lanceolatis acuminatis margine revolutis, floribus terminalibus solitariis aggregatisve, ramulis virgatis pubescentibus.

New Zealand (Northern Island). Margins of dry woods, Bay of Islands.—1826, *A. Cunningham.*

488. *A. ligustrifolia*, foliis (uncialibus) oblongis oblongo-lanceolatisve obtusis margine revolutis integerrimis vel rarissime parum dentatis subtus discoloribus, floribus lateralibus, ramulis tenuissime pubescentibus.

New Zealand (Northern Island). Shaded woods at Wangaroa.—1833, *R. Cunningham.*

489. *A. Banksii*, gracilis, foliis elliptico-oblongis rhomboideisve obtusis basi attenuatis longe petiolatis margine revolutis subintegris dentato-repandis

lobatisve, floribus lateralibus terminalibusve subsolitariis, ramulis pubescentibus. Fagoides triloba. *Banks et Sol. Mss. in herb. Banks, absque fructificatione.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Skirts of woods on the shores of the Bay of Islands.—1834, *R. Cunningham.*

490. *A. palæiformis,* foliis absque petiolis (vix semiuncialibus) longe petiolatis subrotundis rhomboideisve obtusis integerrimis vel parum dentatis basi subcordatis simplicibusve, floribus axillaribus subsolitariis, ramulis tenuiter virgatis strigoso-pubescentibus.

New Zealand (Northern Island). Dense forests of Wangaroa, &c.—1833, *Rich. Cunningham.*

491. *A. atriplicifolia,* foliis elliptico-rhomboideis subrotundisve, obtusis longe petiolatis integris repando-dentatisve, floribus axillaribus aggregatis ramulis glabriusculis.

New Zealand (Northern Island). Dry woods at Wangaroa, &c.—1833, *Rich. Cunningham.*

492. *A. Ilex,* foliis elliptico-oblongis subacuminatis obtusis integerrimis lobatisve, floribus lateralibus terminalibusve fasciculato-racemosis, ramulis glabris.

New Zealand (Northern Island). Shaded woods in the country between the Bay of Islands and Hokianga River.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

493. *A. quercifolia,* foliis ovato-oblongis acuminatis petiolatis distanter lobatis subintegerrimisve, foliis lateralibus fasciculatis, ramulis gracilibus glaberrimis.

New Zealand (Northern Island). Dry woods on the shores of the Bay of Islands.—1826, *A. Cunningham.*

494. *A. macrophylla,* foliis (4—5 uncialibus) oblongis obovatisve coriaceis lævibus obtusis basi attenuatis integerrimis dentatisve, floribus lateralibus solitariis aggregatisve, ramulis glaberrimis.

New Zealand (Northern Island). Margins of dry woods, Hokianga River, &c.—1826, *A. Cunningham.*

This new genus is very closely allied to *Cornea,* DC., as also to the *Caprifoliaceæ* and *Loranthaceæ,* DC.; it appears, however, to constitute a distinct family differing from *Corneæ* in having a monopetalous flower and a baccated fruit, pulpy within, containing several seeds; from *Caprifoliaceæ,* in the stamens being inserted into the corolla, in having an embryo situated at the lower extremity of the albumen, and alternate leaves; and from *Loranthaceæ,* in having a monopetalous flower with a long tube, short segments, with which the stamens are alternate, a bilocular ovarium, each cell with several ascending ovules, and a minute embryo, several times shorter than the fleshy albumen.

UMBELLIFERÆ, *Juss.*

1. Hydrocotyle, *L.*

495. *H. elongata,* tota villis densis patentibus, foliis longe petiolatis reni-

formibus quinquelobis, lobis divaricatis cuneiformibus retusis incisis, incisuris tridentatis, umbellis pedunculatis multifloris, mericarpiis utrinque 1-costatis, pedunculis petiolo quater longioribus, caule debili repente.

New Zealand (Northern Island). Wet grounds near the Keri-Keri river, Bay of Islands.—1834, *R. Cunningham.*

496. *H. microphylla,* depressa, repens, foliis orbiculato-reniformibus laxe pilosis quinquelobis, lobis inæqualiter dentatis, pedunculis glabris petiolo subæqualibus, umbellis multifloris (10—12), fructibus glabris didymis, mericarpiis utrinque 1-costatis.

497. *H. Novæ Zelandiæ,* foliis orbiculato-reniformibus utrinque petiolisque hirtis 7-nerviis obsolete 7-lobatis acute et irregulariter dentatis, pedunculis glabris petiolo quadruplo brevioribus, umbellis dense capitatis 10—12 floris, fructibus subdidymis utrinque 1-costatis. *DC. Prodr.* iv. *p.* 67.

New Zealand.—1827, *D'Urville.*

Obs. An verè species distincta a præcedente?

498. *H. dichondræfolia,* foliis cordato-reniformibus lobato-crenatis 7-nerviis minutissime scabris, petiolis hirtis pedunculo glabro longioribus, umbellis sub 6—8 floris, fructibus didymis glabris utrinque 1-costatis.

New Zealand (Northern Island). In bogs at Waimate and Keri-Keri river.—1834, *R. Cunningham.*

499. *H. heteromeria,* glabra, foliis reniformibus 7-nerviis obsolete 7-lobatis, lobis obtusis crenatis pedunculo petiolo flaccidis multo breviore, umbella 6—8-flora capitata, fructu hinc lævi, illinc tuberculato-rugoso discolori utrinque unicostato. *DC. Prodr.* iv. *p.* 66. *A. Rich. Fl. Nov. Zel. p.* 271.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.*

500. *H. compacta,* villosa, foliis orbiculato-reniformibus parvulis 7-nerviis inciso-dentatis, pedunculis fasciculatis brevissimis, umbellis 15—20 floris dense capitatis, fructibus subdidymis utrinque bicostatis. *DC. Prodr.* iv. *p.* 66. *A. Rich. Fl. Nov. Zel. p.* 271.—H. capitata. *Banks et Sol. Ms. in Herb. Banks.; non Pet. Thouarsii vel Humboldtii.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.*

501. *H. moschata,* tota hirtella, foliis reniformibus sub 5-lobatis dentatis 5-nerviis, lobis acutis pedunculis petiolo brevioribus gracilioribus, umbella capitata 10-flora, fructibus orbiculato-didymis utrinque bicostatis glabris. *DC. Prodr.* iv. *p.* 67. *Forst. Prodr. n.* 136. *A. Rich. Fl. Nov. Zel. p.* 272. *Rich. Hydr. n.* 42. *t.* 24.

New Zealand (Middle Island).—1773, *G. Forster.*

502. *H. Asiatica. L. Schult. Syst. Veg.* vi. *p.* 348. *DC. Prodr.* iv. *p.* 62. *Rich. Hydr. n.* 15. *f.* 11.

New Zealand (Northern Island). Low marshy grounds at Wangaroa.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

2. Petroselinum, *Hoffm. Umb.*

(*Apii Sp.* L. *Spreng.*)

503. *P. prostratum,* caule procumbente flexuoso, foliis pinnatisectis, segmentis petiolulatis pinnatifidis, laciniis 5—7 lanceolatis, ultimis apice trifidis, umbellis subsessilibus oppositifoliis involucro submonophyllo. *DC.*

Prodr. iv. *p.* 102. *A. Rich. Fl. Nov. Zel. p.* 278.—Apium prostratum. *Schult. Syst. Veg.* vi. *p.* 430. *Labill. n. Holl.* i. *p.* 76. *t.* 103. *Venten. Malm. t.* 81.

Rau-orou, incol., *D'Urville.*

New Zealand (Middle Island). Astrolabe Harbour, on granite rocks.—1827, *D'Urville.* (Northern Island,) sea coast near Wangaroa.—1833, *Rich. Cunningham.*

504. *P. filiforme*, caule prostrato filiformi, foliis longe petiolatis 3-foliolatis, foliolis cuneatis apice inciso-dentatis, umbellis sessilibus 3—4 radiis. *A. Rich. Fl. Nov. Zel. p.* 278.

New Zealand (Middle Island). Cook's Strait, in swamps.—1827, *D'Urville.* (Northern Island.) On rocks, washed by salt water, Wangaroa,—1833, *R. Cunningham.*

3. Ligusticum, *L. Koch, Umb.*

505. *L. Aciphylla*, caule vaginato, foliis flabelliformibus multifido-compositis, laciniis linearibus rigidis integerrimis nervosis pungentibus, mericarpiis 3-costatis. *Spreng. in Sch. Syst. Veg.* vi. *p.* 554. *DC. Prodr.* iv. *p.* 159. *A. Rich. Fl. Nov. Zel. p.* 274.—Aciphylla squarrosa. *Forst. Gen. t.* 68. Laserpitium aciphyllum. *L. Suppl. Forst. Prodr. n.* 139.

New Zealand (Middle Island). Shores of Queen Charlotte's Sound.—1773, *G. Forster.*

Obs. Ex Icone certe non est *Laserpitium*! An proprium genus? DC.

506. *L. Gingidium*, caule striato, petiolis vaginantibus laxis, foliis pinnatisectis, segmentis suboblique cordatis oblongo-ovatis obtusis crenatis nervosis. *DC. Prodr.* iv. *p.* 159. *Sch. Syst. Veg.* vi. *p.* 552. *A. Rich. Fl. Nov. Zel. p.* 276. Gingidium montanum. *Forst. Gen. t.* 21.

New Zealand (Middle Island). Mountains, near Queen Charlotte's Sound.—1773, *G. Forster.*

4. Peucedanum, *Koch, DC.*

507. *P.? geniculatum*, glabrum ramoso-prostratum, caule tereti striato, foliis alternis basi cuneatis integerrimis apice semiorbicularibus crenatis, petiolo basi breve et obtuse auriculato, umbella pedunculata 2—3-radiata, involucro 2—3-phyllo, umbellulis multifloris apice inflexo-cordatis. *Forst. DC. Prodr.* iv. *p.* 182. *A. Rich. Fl. Nov. Zel. p.* 272.—Bowlesia geniculata. *Sch. Syst. Veg.* vi. *p.* 364. *Spreng. Umb. p.* 14. *t.* 5. *f.* 11.

New Zealand (Middle Island).—1773, *G. Forster.*

Obs. "Certè non est *Bowlesia*, ob calycem edentatum, petala inflexo-obcordata, umbellatum radiatum. Non videtur *Peucedanum*, sed genus fructu ignoto me omnino latet."—*DC. loc. cit.*

5. Apium, *L.*

508. *A. graveolens. L. Forst. Prodr. n.* 141. *DC. Prodr.* iv. *p.* 101. *A. Rich. Fl. Nov. Zel. p.* 277.

New Zealand.—1773, *G. Forster.*

Obs. Il est extrèmement probable que cette espèce a été introduite par les Européens. *A. Rich.* Yet Forster found it wild in 1773.

ARALIACEÆ, *Juss.*

1. Panax, *L. Forst.*

509. *P. simplex*, foliis simplicibus petiolatis elliptico-oblongis acutis mucronulatis dentato-serratis, racemis terminalibus folio brevioribus. *Forst. Prodr. n.* 399. *DC. Prodr.* iv. *p.* 253. *Sch. Syst. Veg.* vi. *p.* 212. *Willd. Sp. Pl.* 4. *p.* 1152. *A. Rich. Fl. Nov. Zel. p.* 280. *t.* 31.

New Zealand (Middle Island). Dusky Bay.—1773, *G. Forster.*

510. *P. arboreum*, foliis longe petiolatis, foliolis 3—7 petiolulatis obovalibus acutis argute dentatis glabris palmaribus, umbella composita terminali aut axillari, radiis 10—12 pollicaribus, involucris involucellisque nullis, floribus sæpius polygamiis. *Forst. Prodr. n.* 398. *DC. Prodr. n.* 253. *Sch. Syst. Veg.* vi. *p.* 213. *Willd. Sp. Pl.* 4. *p.* 1126. *A. Rich. Fl. Nov. Zel. p.* 281.

Wawa-paku, incol., *R. Cunn.*

New Zealand (Middle Island). Dusky Bay.—1773, *G. Forster.* Tasmann's Bay.—1827, *D'Urville.* (Northern Island). In shaded forests.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

Obs. Caulis arboreus, 12—15 pedalis, ramosus.

2. Cussonia, *Thunb. Nov. Act. Ups.*

511. *C. Lessoni*, foliis longe petiolatis digitatis, foliis 3—5, sessilibus coriaceis integris, oblongo-ellipticis acutis glabris aveniis, floribus racemoso-umbellatis terminalibus, fructu 5-loculari. *A. Rich. Fl. Nov. Zel. p.* 285. *t.* 32.—Panax? Lessoni. *DC. Prodr.* iv. *p.* 253.

Whau-whau, incol., sec. *R. Cunningham.*

New Zealand (Northern Island). Bream Bay, on the east coast.—1827, *D'Urville.* Sea shore opposite the Cavallos isles, within the range of the tide.—1833, *Rich. Cunningham.* *Frutex* 6—10 pedalis.

3. Polyscias, *Forst. Gen. Lamarck.*

Calycis margo brevis denticulatus. *Petala* 5—7, sæpius 8, lanceolata, patentia. *Stamina* tot quot petala, iis alterna. *Stylus* 0. *Stigmata* 3—5 brevissima erecto-patentia. *Bacca* globosa calycis margine stigmatibusque coronata, 4-locularis, 4-sperma.

512. *P. pinnata. Forst. Gen. t.* 32. *DC. Prodr.* iv. p. 257. *Endl. Syn. Fl. Norf. Insul. Occ. Austr. in Annal. der Wien. Mus. Band* i. *p.* 177.

New Zealand (Middle Island).—1773, *G. Forster.* (Endl.)

Frutex. Folia pinnata. *Umbella* composita seu verticillato-prolifera, umbellulis multiradiatis planis, cæt. ign. Genus valde dubium. An *Araliæ* sp.? *DC.* An planta indigena Novæ Zelandiæ? *Allan Cunningham.*

4. Aralia, *Don. Kunth. DC.*

513. *A. Schefflera*, caule fruticoso lævi, foliis longe petiolatis glabris digitatis, foliolis 5-petiolulatis lanceolatis basi attenuatis serrulatis, racemis terminalibus. *Spreng. DC. Prodr.* iv. *p.* 258. *Sch. Syst. Veg.* vi. p. 699. *A. Rich. Fl. Nov. Zel. p.* 283.—A. polygama. *Sol. Ms. in Bibl. Banks.*—Schefflera digitata. *Forst. Gen. t.* 23.

Paté et *Horoika*, incol., *R. Cunningham.*

New Zealand (Northern Island).—1769, *Sir. Jos. Banks.* On low flats,

subject to Wangaroa.—1826, *A. Cunningham.*—1833, *R. Cunningham.* (Middle Island).—1773, *G. Forster.* Astrolabe Harbour.—1827, *D'Urville.*

Arbor 12—15 pedalis.

514. *A. crassifolia* (*Sol. Ms.*), foliis incrassatis lævibus (in planta juvenili) simplicibus elongato-attenuatis remote dentatis dentato-incisisve, arboris adulti ternatis spathulato-elongatis dentatis obtusis, floribus racemoso-umbellatis terminalibus, caule arborescenti. *Banks & Sol. Ms. in Bibl. Banks* (1769).—A. heterophylla. *Cunn. Ms.* 1826.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shaded woods, on the shores of the Bay of Islands, Wangaroa, &c.—1826, *A. Cunningham.* —1833, *R. Cunningham.*

Horoika, incol. *Arbor* polymorpha, 20—31 pedalis.

BIBLIOGRAPHICAL NOTICES.

Plantæ Javanicæ Rariores, descriptæ iconibusque illustratæ, quas in Insula Java, annis 1802—1818, *legit et investigavit* T. Horsfield, M.D. *e siccis descriptiones et characteres plurimarum elaboravit* J. J. Bennett; *observationes structuram et affinitates præsertim respicientes passim adjecit* R. Brown. Part I.—Allen and Co., Leadenhall Street, 1838.

This is one of the most valuable contributions, not only to our knowledge of the plants of the East, but to Botany in the abstract, which has appeared in this country; for the fruits of Dr. Horsfield's researches in Java have elicited some of those profound observations on structure from Mr. Brown, which are alone sufficient to stamp the work with a classical reputation.

But independent of these contributions from this eminent Naturalist, we view Dr. Horsfield's work with peculiar satisfaction, from the evidence it affords of the sagacity and research of Mr. Bennett, who holds the situation of Assistant in the Botanical department of the British Museum, and who has given ample proof in the work before us of his capacity to follow in the steps of his distinguished principal. It is with no little pride that we hail the dawn of a reputation which is to reflect lustre on our national establishment, for the accuracy and learning displayed by Mr. Bennett have placed him high in the rank of Botanists; and when we consider the advantages of his position, with one of the most magnificent Herbaria and libraries in Europe at his command, and the example under which he has pursued his investigations, we look forward with confidence to his maintaining by scrupulous care and research, and the principle of pure mental integrity, the reputation of the Banksian school, already so eminent by the names of Solander, Dryander, and Brown.

The work consists of descriptions and figures of the more interesting plants selected from an Herbarium of 2196 species, collected by Dr. Horsfield in Java between the years 1802 and 1818. This indefatigable naturalist, whose labours (we say this with a distinct recollection of his important publications on the zoology of Java) can only be fully appreciated by those who have seen his vast collections in the Museum of the East India Company, and who is endeared to us by his intimate association with the late lamented Sir Stamford Raffles, and by his extensive acquirements in all departments of natural history, is one of the faithful servants of a company, which, through the spirit communicated to its officers, has certainly been more honoured by men of eminence in its employment, than we believe has ever fallen to the lot of any other government in ancient or modern times. We doubt if an equal number of adventurous and faithful contributors to the stock of human knowledge in all its departments, to those which for a long succession of years have reflected imperishable honour on the East India Company, can be found in the records of any other service. When among many others we allude to the names of Jones, Wilkins, Marsden, Colebrooke, Raffles, Elphinstone, Malcolm, Roxburgh, Hamilton, Hardwicke, Wallich, Horsfield, Royle, men who, in the discharge of important public duties, found time to devote themselves successfully to literature and science, and whose labours have been fully appreciated by the learned in all countries, we cannot but attribute the spirit which animated them to the liberality and encouragement of the Board of Directors of the East India Company. Dr. Horsfield's work, from the beauty of its illustrations and the copiousness of its text, will rank with the splendid publications of Humboldt, Martius, Blume, Wallich, Royle, and we only regret that it is to be limited to the particular description of fifty species. The first part contains twenty-five plates, and one hundred and four pages of letter-press, the greater part of which we owe to Mr. Bennett; and in the rapid analysis which we subjoin, we regret that we cannot enlarge upon several of his observations, especially those on grasses under *Ataxia, Sclerachne* and *Polytoca.* We refer to the work itself for these important articles, and those on *Podocarpus, Antiaris, Pouzolzia,* and *Gunnera,* for proofs of the labour bestowed by Mr. Bennett in his researches.

In the first article, the subject of which is the *Polypodium* (*Dipteris*) *Horsfieldii,* R. Br., Mr. Brown reduces Professor Reinwardt's genus *Dipteris* to the rank of a subgenus of *Polypodium,* comprising the species here figured, and *Polypodium* (*Dipteris*) *Wallichii.* He remarks on the necessity of subdivision in this very extensive genus,

now consisting of about three hundred species, and observes, that "for such subdivision, not in *Polypodium* only, but in other extensive genera of Ferns, the most obvious as well as the most advantageous source of character, seems to be the modifications of vascular structure, or the various ramifications of the bundles of vessels, or veins of the frond, combined with the relation of the sori to their trunks or branches." This principle of subdivision in Ferns, first employed by Mr. Brown himself in the characters of various genera in his 'Prodromus Floræ Novæ Hollandiæ,' has since been adopted with considerable advantage by several writers on the subject. The subgenus in question agrees with *Drynaria* of M. Bory in the position of its sori at the point of confluence of several veins, but differs from it and from all other groups of *Polypodium* in the dichotomous ramification of its primary veins, which is necessarily connected with the peculiar division of the frond, and forms, therefore, a character of at least equal importance with those on which several groups, of supposed generic value, have been founded. Setting aside this peculiar ramification, there remains no sufficient character to distinguish *Dipteris* from *Drynaria*; and *Drynaria* itself can only be separated from a more extensive section comprehending *Polypodium plymatodes*, &c., by the presence of sterile fronds. From this section Mr. Brown passes to the consideration of an extensive group, also having anastomosing veins, but in which the sori are seated on the apices of one, or occasionally of two or three ultimate ramuli, included in an area, formed by the anastomosing secondary veins. To this section he gives the subgeneric name of *Phlebodium*; and next in affinity to it he places a group, most of whose species have simple fronds, and all of which are natives of America, to which he assigns the name of *Cyrtophlebium*, its primary parallel veins being "connected by transverse arched branches, from the convex upper side of which generally three (and never more than three) upright parallel simple veins arise, terminating within the area included between the proximate transverse arched branches; of these simple tertiary ramuli the two lateral are soriferous, generally below the apex, the middle branch being always sterile." An analogous arrangement, but with some modifications, exists in the real species of *Cyclophorus*, none of which are natives of America. Mr. Brown next proceeds to notice an extensive and strictly natural group or subgenus, the *Lastrea* of M. Bory, the closest affinity of which he states to be "not to any group of *Polypodium*, but to that section of *Gymnogramma*, the division of whose fronds, and the disposition of veins, are exactly similar, and in which the sori form very short lines of like origin." The distinc-

tion between the two being thus reduced to a difference, generally very slight, in the form of the sori, Mr. Brown is of opinion with Dr. Blume that these two tribes cannot be generically separated, and suggests that "the section of *Gymnogramma* referred to should be removed from that genus, and if still distinguished as a genus or subgenus, might receive the name of *Pleurogramma*." With this section *Meniscium* is also manifestly related, as well as that section of *Nephrodium* which M. Gaudichaud has separated under the generic name of *Polystichum*; "an approximation which appears to be confirmed by more than one fern, entirely agreeing in habit, in undivided veins and lateral fructification with this group of *Nephrodium*, but having a short linear sorus with an indusium of corresponding form, inserted by its longitudinal axis in the middle of the sorus." To this group Mr. Brown gives the name of *Mesochlæna*, and observes that "though in general appearance it is abundantly different from *Didymochlæna*, it can only be distinguished from that genus, according to my view of the structure of its indusium, by its simple veins and lateral sori." Some observations follow on "the most extensive but least natural section" of the genus, in which none of the veins anastomose, and of which *Polypodium vulgare* is one of the best examples; and Mr. Brown concludes this branch of the subject by observing: "That subgeneric or sectional characters may in several instances be obtained or assisted from the seeds of this Natural Order is not improbable, and in one case, namely *Ceratopteris* (or *Teleozoma*), including *Parkeria* in the genus, even the generic character appears chiefly to reside in the seeds, which in their unusual size and peculiar marking or striation, entirely agree in all the species of the genus, while in the original species the annulus is nearly complete; and in *Parkeria*, differing from the rest of the genus in no other point whatever, the ring is reduced to a few faint striæ."

In another observation on the same fern, bearing more particularly on structure, Mr. Brown notices two remarkable points connected with the organization of the subgenus to which it belongs. First, "the existence of the complete circle of vasa scalariformia separating the ligneous or fibrous vessels of the caudex into an outer and inner portion," which is also found in the caudex of *Platyzoma*, but not of *Gleichenia*, and in some (probably in all) of the species of *Anemia*. Secondly, the production in *Polypodium* (*Dipteris*) *Wallichii*, of a gum-like pulpy substance, in which the capsules are imbedded, even when fully formed, and the remains of which may be found after the spora are discharged. In the dried specimens this pulpy substance had no appearance of organization, but in the living

plant Mr. Brown suspects it to be minutely cellular, in which state he has observed it to occur in the nascent sori of several species of *Polypodium*, the peculiarity in the present instance consisting merely in its prolonged duration.

The second article relates to another species of *Polypodium* (*P. papillosum*, Bl.), which is described by Mr. Bennett as forming part of the same section with *P. vulgare*, and is chiefly remarkable as the only described species with immersed sori, belonging to that subdivision, and for the extent to which the immersion is carried, the sori "being completely buried within the sac, which forms a mammillary protuberance of considerable height on the upper surface of the frond." Mr. Bennett makes some observations on the differences in venation which occur in this great section; and particularly notices two undescribed species belonging to it as interesting on account of remarkable peculiarities connected with their sori.

The third article has for its subject a grass, formerly referred to by Mr. Brown, in his 'Chloris Melvilliana,' appended to the narrative of Captain Parry's First Expedition, under the name of *Ataxia*, and since introduced by M. Kunth, from the characters there given, into his 'Enumeratio,' with the specific name of *Horsfieldii*. It is described by Mr. Brown as in habit and structure exactly intermediate between *Anthoxanthum* and *Hierochloe*, in conjunction with which it forms "a very natural and well-characterized section, which belongs rather to the tribe *Avenaceæ* than to *Phalarideæ*." "In all of them," he observes, "the upper valve of the hermaphrodite flosculus has a single nerve occupying its axis, and one of the two stamina is placed opposite to this nerve. The co-existence of these two characters, both of which are remarkable deviations from the usual arrangement in *Gramineæ*, seems to invalidate the hypothesis respecting the composition of the inner valve of the flower of this family. It might, however, be assumed that the median nerve in these genera is formed of two confluent cords, a view to a certain extent supported by the somewhat analogous structure in the corolla of *Compositæ*. It might also be assumed that the stamen belongs to the inner or complementary series, which is rarely developed in triandrous grasses." In connexion with this subject Mr. Brown also notices two remarkable genera found in Abyssinia, the one by Dr. Rüppell, and the other by Professor Ehrenberg; and particularly describes the very singular modification of structure which is found in the former.

With reference to the difference in the number of stamina between the male and hermaphrodite flowers of *Ataxia* and *Hierochloe*, Mr.

Bennett proceeds to examine in detail the various modifications which take place in grasses in the number of these organs, and the relation which these modifications severally bear to the composition of the perianthium as indicated by its nerves. Adopting the well-known hypothesis of Mr. Brown, before referred to, he endeavours to show that "the structure of those grasses, in which deviations occur from the ordinary number of stamina will be found perfectly to accord with this view of the subject, and to afford perhaps some additional arguments in its favour." With this object he passes these deviations in review, noting especially those cases in which a posterior stamen is coincident with a middle nerve in the inner valve of the perianthium; and the rare exceptions in which either of these structures is found unaccompanied by the other, for which exceptions he endeavours in some degree to account.

In the two succeeding articles Mr. Brown characterizes two new genera of grasses, (*Sclerachne* and *Polytoca*) selected to illustrate the close affinity subsisting between *Coix* and *Tripsacum*, in the very gradual transition between which they form two of the intermediate stages. This transition is further assisted by another new genus, *Chionachne*, founded on the *Coix arundinacea* of Willdenow, the distinguishing characters of which are pointed out. Of these several genera Mr. Bennett enters into a detailed comparison, which clearly exhibits the intimate connexion between them, as well as the near relation of *Tripsacum* to *Rottbœllia*. They all belong to Mr. Brown's great division of *Paniceæ*, together with *Zea Mays*, "which is also a nearly related grass, being manifestly allied to *Polytoca*, and one whose Paniceous character is so obvious that it is surprising that it should not long ago have assumed its proper station in that tribe." Such mistakes in natural affinities as have taken place with reference to *Coix*, *Tripsacum*, and *Zea*, Mr. Bennett thinks, can only be attributed "to the want of due attention to the very striking and important character by which the *Paniceæ* are connected together," and which in the further subdivision of the order has been in a great degree neglected and overlooked.

The sixth article illustrates a genus of Grasses, *Leptaspis*, founded by Mr. Brown in the 'Prodromus Floræ Novæ Hollandiæ' on the species here figured, which is the *Pharus urceolatus* of Roxburgh, and on a New Holland species discovered by Sir Joseph Banks. Mr. Bennett shows that the character of this genus has been much misunderstood by later writers, who had had no opportunity of examining either of the species; and points out the differences in structure be-

tween it and *Pharus*, and the modifications that occur in the two species of *Leptaspis* itself.

Next follow two remarkable Orchideous plants characterized by Mr. Brown, of which the first, *Hexameria disticha*, belonging to the tribe of *Malaxideæ* is especially remarkable for the number and mode of attachment of its pollen masses, which are described as "in singulo loculo tres (!), quarum duæ inferiores collaterales, tertia superior, omnes apice acuto affixæ corpusculo septiformi loculum longitudinaliter bipartienti et cum eodem deciduæ." The other, *Phalænopsis*, Bl., (*Epidendrum amabile*, L.) belongs to the tribe of *Vandeæ*, and is singularly interesting on account of the size and beauty of its white odoriferous flowers, the curious structure of its labellum, and the mode of attachment of its pollen masses to the stigmatic gland. To the account here given by Mr. Bennett, we may add that it is the "Visco-Aloes 14ta," of Kamel in Ray's 'Historia Plantarum,' App. p. 34, pl. 20, and of Petiver's 'Gazophylacium,' t. 103, f. 10; and that it has also been recently found by Mr. Cuming in the Island of Luçon.

In the ninth article Mr. Bennett describes a species of *Freycinetia*, a genus distinguished from *Pandanus* by Mr. Brown, and characterized by him in the 'Prodromus Floræ Novæ Hollandiæ,' but only recently named by M. Gaudichaud in the botanical part of M. Freycinet's 'Voyage autour du Monde.' This genus deviates widely in many respects from the true *Pandanus*, with which Mr. Bennett compares or rather contrasts it in various essential points, in many of which it approximates the anomalous genera *Cyclanthus* and *Carludovica*. With respect to the position of the embryo, he corrects an error of M. Gaudichaud, who had both described and figured it as placed at the apex of the albumen instead of at its base. He divides the known species of *Freycinetia*, seven in number, into two sections, corresponding with those of *Pandanus*, in the one of which the pericarpia are simple and equally coherent, while in the other they are collected into partial phalanges, varying in character in the different species.

In an article on *Podocarpus cupressina*, a species first indicated by Mr. Brown in M. Mirbel's paper on the Geography of *Coniferæ*, Mr. Bennett adverts to the peculiar character of the genus as given by Mr. Brown in his 'General Remarks on the Botany of Terra Australis,' and notices the attempt of M. Achille Richard to invalidate the comparison there instituted between *Podocarpus* and *Dacrydium*. He expresses his surprise that botanists should have concurred

in separating these genera from the true pines, and associating them with the yew. "That their true position," he says, "is in the Abietine section of the family was pointed out to me by Mr. Brown when placing in my hands the specimens now described. Not only do their inverted ovula bear the same relation to the supporting scale as in the genera of that group, but we even find in *Araucaria* an analogous structure as regards the confluence of the scale with the envelope of the solitary ovulum. Thus *Podocarpus* might be regarded as an *Araucaria* reduced to a single fertile scale, or at most to three such scales, were it not that in the latter there exists, as far as we are yet aware, but a single envelope of the seed, while in the former its coats are double." Mr. Bennett refers to the structure of the male organs, and especially of the pollen, as confirmatory of this arrangement, the pollen of *Podocarpus* and *Dacrydium* being perfectly identical in structure with that of all the species of *Pinus*, (with the single exception of the Larch,) while that of the *Cupressinæ*, (including *Taxus*) is altogether different and equally remarkable; "the sphæroidal form of its grains, together with the singular mode in which their outer coats are ruptured and thrown off, in consequence of the great capacity for absorbing moisture possessed by the mucous matter surrounding the inner," having been some years ago pointed out to him by Mr. Brown as readily distinguishing that section from the greater portion of the true *Coniferæ*. He then proceeds to notice the successive additions made to the genus *Podocarpus*, which now consists of four or five and twenty species, divisible into four distinct and strictly natural sections, distributed over all the great geographical divisions of the globe, Europe alone excepted, and extending in latitude from the equator to Japan northward, and to New Zealand in the south. These sections he characterizes, and enumerates under each the names of the species referrible to it, as far as they are known to him by his own examination, or by sufficient figures and descriptions.

Bragantia tomentosa, Bl., forms the subject of the eleventh article, in which Mr. Bennett also notices the other species belonging to the genus, and adverts to the more essential modifications occurring in their structure. He refers to the genus *Trimeriza* of Professor Lindley, which he is of opinion cannot be distinguished from *Bragantia*, the characters relied upon for its separation being equally found in the original species to which the latter name was first applied, and being he thinks of too small importance in so limited a group to justify the severing of these from the remaining species. He points out the relations of *Bragantia* to *Asarum*, *Aristolochia* and

Thattea, to each of which it approaches in different particulars of its structure; and gives in a note some additional information on the subject of the latter genus, extracted from the MSS. of Dr. Kœnig, by whom alone it has yet been found.

[We reserve the conclusion of this review for our next Number. —Edit.]

Icones Avium, or Figures and Descriptions of new and interesting Species of Birds from various parts of the World. By John Gould, F.L.S. Folio. August 1838.

Part II. Monograph of the Caprimulgidæ.

At the meeting of the British Association in 1837 Mr. Gould was requested to prepare and write a monograph of the genus *Caprimulgus*, Linn., the species of which, from the great accession to their numbers from various parts of the world, were comparatively unknown, while the very singular forms that had been discovered and the curious natural habits of the group rendered its history a subject of considerable interest to the ornithologist. Mr. Gould in the mean time contemplating a voyage to Australia, and having sailed for that land about nine months after the allotment of his task, could only commence the work and have the first part ready to be laid before the meeting of the British Association at Newcastle, which both does ample credit to the talents of its author, and depicts some of the most remarkable forms in the whole range of ornithology. It has been made a continuation of the 'Icones Avium,' the first part of which we noticed in a former number (No. III. p. 223), and the plan adopted has been to figure and describe each species, with the intention of entering into their history and habits, as a prefatory or concluding essay.

Part I. contains beautifully executed lithographic figures of eight species, from which Mr. Gould has made no less than five new generic names. These we cannot criticise until we see the whole of his proposed arrangement. They are *Amblypterus anomalus*, G., a small species, supposed to be found in Demerara, and remarkable for the curved and sickle form of the quill feathers. *Nyctydromus Derbyanus*, G., a South American species, one of those with lengthened tarsi, and which Mr. Gould presumes run much on the ground. Ten species are said to be known of this group. *Semeiophorus* (*Macrodipteryx*) *vexillarius*, G., a very remarkable form and placed here as a subgenus of *Macrodipteryx* on account of the different structure of the wing, the sixth, seventh, and eighth quills gradually lengthening, while the ninth stretches to an enormous length. *Lyncornis cervini-*

ceps, macrotis and *Temminckii*, G., three beautiful species from the continent and islands of India, remarkable for lengthened egrets, and great development of wing. *Batrachostomus auritus*, G. (*Podargus auritus*, Vig. & Horsf.), and, lastly, *Nyctibius pectoralis*, G., a native of Brazil.

Archiv für Naturgeschichte. In Verbindung mit mehreren Gelehrten, herausgegeben von Dr. Ar. Fr. Aug. Wiegmann, Professor an der Friederich Wilhelms-Universität zu Berlin. Vierter Jahrgang. Drittes Heft. Berlin, 1838.

[Continued from p. 138.]

In the last number of the 'Annals' we merely mentioned the interesting memoir of M. Dassen *on the motions of the leaves of Plants** intending to give a condensed extract from it when we should have occasion to notice the present part of the 'Archiv.' As this however has been done by Dr. J. Meyen in his excellent *Report on the Progress of Physiological Botany during the year* 1837, we take the liberty of translating the part referring to this paper, which will at the same time contain Dr. Meyen's opinion on the subject.

M. Dassen, who has published the beautiful memoir on the motion of the leaves of plants, of which Prof. Wiegmann has inserted an extract in his journal, has drawn the attention of botanists to a phænomenon of leaf-motion hitherto little attended to. The leaves of those plants which move are frequently provided with swellings at their base; there are however other leaves which move without these swellings. The motion of these latter again presents in various plants considerable differences, which are more particularly described in this memoir; it consists in the inversion of their natural position, which is sometimes performed in the space of a day, but sometimes takes a much longer time. M. Dassen displaced some branches of trees and various other plants from their natural position, and bound them fast to the stem, so that they hung downwards: in the course of a few days they had spread themselves out so much that the upper surface of the leaves was again turned upwards. These experiments were made in June when vegetation was in full force, and the result was the same in all cases. The experiments were then repeated in October, when most of the branches remained motionless; only those of rose trees, of *Robiniæ*, and of herbaceous plants endeavoured to regain their previous position. The following question then pre-

* Onderzoek aangaande de Bladbewegingen, die niet door aanzwellingen ontstaan.

sented itself:—By what is the motion of the branches effected, whether by a cause seated in themselves, or by the leaves? To determine this question, M. Dassen repeated the experiments on branches with and without leaves, and observed that those branches which had been deprived of their leaves remained in their unnatural position; the leaves were therefore regarded as the cause of this motion of the branches. Subsequent experiments were made in order to discover the mechanism producing the motion of the leaves, whether the nerves of the leaves remained during the process active or passive, &c., and the following results were arrived at: that leaves with simple nerves and without petioles change their position from the unnatural to the natural as well as those with petioles; and 2ndly, that the parenchyma is the cause and not the nerves. Further observations respecting the mechanism producing the motion of leaves with and without petioles gave the following results: 1. All leaves with simple veins have the power of self inversion; 2. The apparently unpetiolated leaves in which the veins are diffused in a different manner, move by a bend in their point of adhesion; 3. The short and stiff as well as the long and slender petioles are unfavourable to the motion; 4. When the petiole is not too stiff or long, the inversion of the leaves is produced by a semi-inversion lengthwise and also by a bend of the petiole; 5. In *folia peltata* the motion takes place partly by a bend of the petiole itself, partly by a change in the direction of the leaf with reference to the petiole. M. Dassen then proceeds to the examination of the causes which produce the motion of leaves: various plants stationed in pots were left to grow turned from the light, and some even without light in closed boxes. The result was highly remarkable: the leaves of those plants which could not turn themselves round died, but the remainder were inverted quite as quickly in the dark as in the light, whence M. Dassen arrives at the conclusion, that light was no more the cause of the direction of the leaves upwards than darkness is the cause of the downward direction of the root. Neither can the action of heat or that of moisture be regarded as the cause of this motion. Finally M. Dassen passes in review those motions of the leaves which take place constantly in the course of one day, and even without swellings; these are the phænomena which, as is well known, were regarded by Linnæus as the sleep of plants. M. Dassen considers Linnæus's explanation as an error into which that great man fell, as well as all those who have merely copied almost word for word from him respecting this point. The memoir *On the Sleep of Plants*, by E. Meyer, which I noticed in my report for 1835, as highly interesting and full of laborious research, is

especially attacked. I cannot however agree with M. Dassen; for all the valuable observations which Meyer had enumerated respecting this phænomenon may be explained in a different sense, and in fact more in accordance with nature, if we start from the general point of view, by the periodical occurrence of sleep, which appears to be common to all animated beings. M. Dassen placed a pot containing *Impatiens noli tangere* during the night in a dark place, and the result was, that the leaves even during the following day retained the same direction. Another plant was placed during the daytime in a dark place, and for two entire days the leaves retained the usual direction which is proper to them in the daytime. From these and other experiments M. D. concludes that the motions of plants without swellings are caused solely by the process of vegetation, and that this is rendered evident as soon as the leaves are exposed to unnatural external influences.

I ask then, whether from the examples cited, the phænomenon of vegetable sleep can be denied? On the contrary, phænomena exactly similar may be proved to exist in animals.

The second paper in the present part, by Prof. B. Fries on the genus *Syngnathus*, will be found translated in No. VIII. of this Journal.

3. Metamorphosis observed in *Syngnathus lumbriciformis*, by Prof. B. Fries. This interesting paper, which will find its place in one of our following numbers, contains a most curious fact hitherto unobserved in the class of fish; namely, that the young of this beautiful species at their development from the egg have the entire tail covered with a fin-like membrane and possess pectoral fins. These at a subsequent unknown period are thrown off in a way similar to that of the larvæ of frogs rejecting their tails.

4. Considerations on the Dentition of the Carnivora (First Part *Feræ*) by Prof. Wiegmann. The great length of this memoir and its not being concluded in the present part obliges us to reserve the notice of it till the next part.

We now come to Prof. Meyen's Annual Report of the Results of the labours in the field of Physiological Botany during the year 1837. We mentioned in our first notice of this work, vol. i. p. 231. the nature and value of these elaborate reports, and expressed our sorrow at not being able from want of space to give translations of those on Botany and Zoology. The perusal of the present report has increased our regret, as it contains detailed analyses and reviews of most of the important memoirs and works on physiological botany published during the past year. Among others we may mention some by Mirbel,

Schleiden, Dutrochet, Meyer, Decaisne, Von Martius, Lindenberg, Dassen, Morren, Göppert, Mohl, Martens, Berzelius, Fritzsch, and numerous other botanists of celebrity. As, however, the insertion of the whole report will be impossible, we shall endeavour to give some extracts from it, especially those referring to papers by naturalists of this country. The entire report consists of nearly 200 octavo closely printed pages, and is, we learn, to be had separately.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

February 13th, 1838.—William Yarrell, Esq., in the Chair.

Mr. Waterhouse exhibited a new species of Squirrel from the Society's Museum, and characterized it as:

SCIURUS SUBLINEATUS. *Sc. suprà fusco-olivaceus flavescente lavatus; lineis dorsalibus quatuor nigris tribus albescentibus, a humeris ad uropygium excurrentibus: abdomine flavescente: caudâ nigro flavoque annulatâ.*

	unc.	lin.
Longitudo *corporis* ab apice rostri ad caudæ basin..	6	0
——— ab apice rostri ad auris basin.....	1	$2\frac{1}{2}$
——— *caudæ* (pilis inclusis)	0	5
——— *tarsi digitorum*que	1	$2\frac{1}{4}$
——— *auris*	0	$2\frac{1}{2}$

Habitat ——— ?

"This animal is less than the Palm Squirrel (*Sciurus palmarum*, Auct.), but like that species has four dark and three pale lines on the back: these lines, however, are very narrow, and occupy only the central portion of the back; they are not continued on to the shoulders, neither do they extend over the haunches. The general colour is olive-brown, a tint arising from the hairs being each minutely annulated with deep yellow and black. The throat, chest, and rump, are whitish, and the belly is yellow. The hairs covering the feet above are annulated like those of the body, but of a deeper tint. The tail is cylindrical and rather slender, and exhibits obscure annulations, each hair being annulated with deep golden yellow and black. The fur is short and soft, that on the back is grey at the base; on the under parts the hairs are very obscurely tinted with grey at the base. The hairs of the moustaches are numerous, moderately long, rather slender, and of a black colour. The head

is very nearly uniform in colour with the body; it is however less yellow."

Mr. Blyth called the attention of the Society to a peculiarity in the structure of the feet in the *Trogonidæ*, which he thought had not been previously noticed. This family, although *zygodactylous*, have the toes disposed on quite a different principle from the Woodpeckers, Parrots, and other birds, which present an analogous structure; their first and second toes being opposed to the third and fourth, in lieu of the first and fourth to the second and third, in consequence of which, that toe, which corresponds to the middle one in birds that are not yoke-footed, that is to say, the third or longest toe, is the inward of the two forward toes in the *Trogon* family, and the outward in the Woodpeckers and Parrots.

A continuation of Mr. Owen's paper, on the Anatomy of the Giraffe was then read, embracing the principal features of interest in the osteological peculiarities of this animal. The abstract will be found in No. 62 of the Proceedings, from which the following are extracts.

The author, in the first place, details the result of his investigation into the evidence bearing upon the supposition of there being in the male Nubian Giraffe a third horn, situated anteriorly in the mesial line of the *cranium*.

Upon making a section of the skull of the male Cape Giraffe, the anterior protuberance was shown to be due only to a thickening and elevation of the anterior extremities of the frontal, and the contiguous extremities of the nasal, bones; and in the Nubian Giraffe the existence of a third distinct bony *nucleus* was also satisfactorily negatived; for, upon macerating the skulls of individuals which had not attained the adult age, the posterior horns became detached from the bones of the *cranium*; but no such separation took place in respect to the protuberances forming the supposed third horn, which would have been the case had its relation to the *cranium* been that of a distinct *epiphysis*.

In both the Cape and Nubian Giraffe, the horns were placed immediately over the coronal suture, which traversed the centre of their expanded bases. The frontal bones were distinct and joined by a well-marked suture, continued along the posterior two-thirds of the frontal protuberance, or as far as the nasal bones. The sagittal suture was persistent on both sides external to the horns. The parietal bone was single and anchylosed with the occipital and interparietal bones.

The male Giraffe, in both the Cape and Nubian varieties, has the

horns nearly twice as large as those of the female; the expanded bases of the horns also in the former, meet in the middle line of the skull, but in the female the bases of the horns are at least two inches apart.

The nasal bone was bifurcate at its anterior extremity as in the Deer, not simply pointed as in most of the Antelopes.

With respect to the cervical *vertebræ* of the Giraffe, Mr. Owen observes, that they are not only remarkable for their great length, but also, as has been recently shown by Dr. Blainville, for the ball and socket form of the articulations of their bodies; the convexity being on the anterior extremity, and the concavity posteriorly, agreeing in this particular with the *vertebræ* of the Camel.

Processes, analogous to the inferior transverse processes in the Crocodile, extended downwards and outwards from the lower part of the anterior extremity of each of the cervical *vertebræ* (except the *atlas* and *dentata*), but of much smaller size than the corresponding processes in the Camel.

The perforations for the vertebral arteries were large, and present in the seventh as well as in the rest of the cervical *vertebræ*; they were situated above the transverse processes in the side of the bodies of the *vertebræ* at the base of the superior *laminæ*. Mr. Owen observes, that although this position of the arterial *foramina* is somewhat peculiar, yet, in this respect, the Giraffe comes nearer the horned Ruminants than the long-necked *Camelidæ*.

In viewing the vertebral column of the Giraffe from above, the cervical *vertebræ* are seen to present the broadest bodies; of these the third and fourth are the narrowest and longest, the rest gradually increasing in breadth and diminishing in length to the seventh: the dorsal *vertebræ* thence grow narrower to the ninth, after which the *vertebræ* increase in breadth chiefly by the progressive development of the transverse processes.

Mr. Owen remarks, in conclusion, that the order *Ruminantia*, perhaps the most natural in the mammiferous class, if we look to the condition of the organs of nutrition, presents, however, more variety than any of the carnivorous orders, in the local development of the organs of relation, and the consequent modification of external form: the most remarkable of these modifications is undoubtedly that which we admire in the Giraffe, and the anatomical peculiarities, which its internal organization presents, are principally confined to the skeleton in respect to the proportions of its different parts; and to those parts of the muscular and nervous systems immediately relating to the local peculiarities in the development of the osseous framework.

February 28, 1838.—Richard Owen, Esq., in the Chair.

Some observations were made by M. Bibron upon two European species of *Triton* indigenous to this country, *Triton cristatus* and *Trit. marmoratus*, which many naturalists consider to have been erroneously separated. M. Bibron, however, entertains no doubt whatever of their being really distinct, and pointed out a character by which he states they may readily be distinguished, and which he believed to have been hitherto unnoticed. This distinction consists in the form of the upper lip, which in *Triton cristatus* is so largely developed as to overlap the under lip posteriorly when the jaws are closed, a condition never present in *Trit. marmoratus*.

Mr. Ogilby exhibited and characterized, under the name of *Macropus rufiventer*, a new species of Kangaroo which Mr. Gould had received from Tasmania, where it is known by the name of Wallabee*.

Mr. Waterhouse exhibited a drawing, and the tail and jaws of a new species of *Delphinus*, which he characterized as

Delphinus Fitzroyi. *Delph. suprà niger; capitis corporisque lateribus, corporeque subtùs, niveis; caudâ, pedibus, labioque inferiore, nigris; fasciis latis duabus per latus utrumque obliquè excurrentibus, hujusque coloris fasciâ utrinque angulo oris ad pedem tendente.*

	ft.	in.	lin.
Total length (measuring along curve of back)	5	4	0
Length from tip of muzzle to vent	3	10	9
Length from tip of muzzle to dorsal fin	2	6	5
Length from tip of muzzle to pectoral	1	4	5
Length from tip of muzzle to eye	0	9	9
Length from tip of muzzle to breathing aperture (following curve of head)	0	10	7
Length from tip of muzzle to angle of mouth	0	7	9
Length of dorsal fin (along the anterior margin)	1	0	5
Height of ditto	0	6	4
Length of pectoral, (along anterior margin)	1	2	8
Width of tail	1	4	5
Girth of body before dorsal fin	3	0	6
Girth of body before pectoral fin	2	8	2
Girth of body before tail fin	0	7	8
Girth of head over the eyes	2	0	0

Habitat, Coast of Patagonia, lat. 42° 30′. (April).

"This species, which I have taken the liberty of naming after Captain Fitzroy, the Commander of the Beagle, approaches, in some respects, to the *Delphinus superciliosus* of the 'Voyage de la Coquille,' but that animal does not possess the oblique dark-gray bands

* Described by Mr. Ogilby in the Annals of Natural History, vol. i. p. 320.

on the sides of the body; it likewise wants the gray mark which extends from the angle of the mouth to the pectoral fins. In the figure, the under lip of the *Delph. superciliosus* is represented as almost white, whereas in the present species it is black: judging from the figures, there is likewise considerable difference in the form. The figure which illustrates this description agrees with the dimensions, which were carefully taken by Mr. Darwin immediately after the animal was captured, and hence is correct."

Mr. Gould exhibited two species of the genus *Ptilotis*, which he characterized as *Ptil. ornata*, and *Ptil. flavigula*.

PTILOTIS ORNATA. *Ptil. vertice, alarum marginibus externis, necnon caudæ olivaceis; dorso uropygioque brunneis; gulâ, genisque olivaceo-fuscis; pectore corporeque subtùs cinerescentibus, singulis plumis notâ latâ brunneâ in medio ornatis; crisso pallidè badio plumis fusco striatis, penicillâ nitidè flavâ utrumque colli latus ornante; notâ longitudinali sub oculos olivaceâ; primariis rectricibusque caudæ fuscis, his ad apicem externum albis; rostro nigrescente; pedibus brunneis.*

Long. tot. $6\frac{1}{2}$ unc.; *rostri*, $\frac{3}{4}$; *alæ*, $3\frac{5}{8}$; *caudæ*, $3\frac{1}{8}$; *tarsi*, $\frac{3}{4}$.

Hab. Swan River, Australia.

PTILOTIS FLAVIGULA. *Ptil. capite, nuchâ, genis, corporeque inferiore nigro-griseis, hoc colore apud abdomen crissumque olivaceo tincto; plumis auricularibus argenteo-cinereis et post has guttâ flavâ; gulâ flavâ; alis, dorso, caudâque, flavescenti-olivaceis; femoribus olivaceis; rostro pedibusque nigrescentibus.*

Long. tot. 8 unc.; *rostri*, 1; *alæ*, $4\frac{1}{4}$; *caudæ*, $4\frac{1}{4}$; *tarsi*, 1.

Hab. Van Diemen's Land and New South Wales.

March 13th, 1838.—William Yarrell, Esq., in the Chair.

Mr. Ogilby read a letter from M. V. der Hoeven, in which the writer expresses his belief that the large Salamander preserved in a living state at Leyden ought to be regarded as a species of Harlan's genus *Menopoma*; its specific characters consisting in the absence of the branchial apertures, which are present in the species upon which Harlan founded his genus. M. V. der Hoeven thinks it probable that the branchial apertures were present in the Leyden Salamander in the young state, and he proposes to adopt the generic term *Cryptobranchus* in preference to that of *Menopoma*, and to give it the specific name of *Japonicus*. He further states that his observations upon this singular reptile will shortly be published in a Dutch Journal.

Mr. Owen observed, with reference to the opinion of M. V. der Hoeven respecting the relations of the Gigantic Salamander of Japan to the *Menopoma* of the Alleghany Mountains, that the persist-

ence of branchial apertures was a structure so likely to influence not only the habits of an amphibious reptile, but also the structural modifications of the osseous and vascular parts of the respiratory organs, as to render it highly improbable that the *Menopoma* should be related generically to a species having no trace of those apertures. He thought, therefore, that the question of the *Menopoma* and gigantic Japanese Salamander being different species of the same genus, could be entertained only on the supposition, that the branchial apertures were a transitional structure in the former reptile as they are in the latter. That this was the case he considered as highly improbable; for, besides the ossified state of the hyoid apparatus, there was evidence in the Hunterian Collection that both the male and female generative organs in the *Menopoma* have arrived at maturity without any change having taken place in the condition of the branchial apparatus usually considered as characteristic of the *Menopoma*. He therefore considered it to be undoubtedly generically distinct from the gigantic Salamander of Japan, the true affinities of which could only be determined satisfactorily after a complete anatomical investigation, especially of its sanguiferous, respiratory, and osseous systems.

Mr. Ogilby exhibited a drawing, made by Major Mitchell, of a Marsupial animal found by that officer on the banks of the river Murray, during his late journey in the interior of New South Wales. Mr. Ogilby stated his original belief that the animal in question belonged to the *Perameles*, under which impression he had proposed to name it *Per. ecaudatus*, from its entire want of tail, a character found in no other species of the same group; but a drawing of the fore-foot, afterwards found by Major Mitchell, and likewise exhibited to the Society on the present occasion, had considerably shaken this first opinion, and induced Mr. Ogilby to suspect that the animal may eventually form the type of a new genus. According to Major Mitchell's drawing, and the notes which he took at the time of examining the specimen, it would appear that there were only two toes on the fore-feet, which were described as having been so perfectly similar to those of a pig, as to have procured for the animal the name of the pig-footed bandicoot, among the persons of the expedition.

The drawing of the foot, in fact, very closely resembles that of the genus *Sus* in form and characters; two toes only are represented, short, and of equal length; but there is a swelling at the base of the first *phalanges*, which renders it probable that there may be two smaller ones behind. The *Perameles*, on the contrary, have three

middle toes on the fore feet, all of equal length, and armed with very long, powerful claws, besides a small rudimentary toe very distinctly marked on each side. The form and character of the hind feet were perfectly similar to those of the *Perameles*; as were also the teeth, as far as could be judged from the drawing, except that the canines did not appear to surpass the anterior molars in point of size. The ears were long, elliptical, and nearly naked; the head broad between the ears, and very much attenuated towards the muzzle; the body about the size of a small rabbit, and the fur very much of the same quality and colour as in that animal. Mr. Ogilby, after expressing his confidence in the fidelity of Major Mitchell's drawings, and the care with which that gentleman assured him he had made the observation in question, expressed his belief that this animal would be found to constitute a new genus of Marsupials, and proposed for it the provisional name of *Chæropus*, in allusion to the described characters of the fore feet.

The following is the notice of this animal inserted by Major Mitchell in his journal, on the occasion of first discovering it. "June 16, 1836. The most remarkable incident of this day's journey was the discovery of an animal of which I had seen only a head in a fossil state in the limestone caves of Wellington Valley, where, from its very singular form, I supposed it to belong to some extinct species. The chief peculiarity then observed was the broad head and very long, slender snout, which resembled the narrow neck of a wide bottle; but in the living animal the absence of a tail was still more remarkable. The feet, and especially the fore legs, were also singularly formed, the latter resembling those of a Pig; and the marsupial opening was downwards, and not upwards, as in the Kangaroo and others of that class of animals. This quadruped was discovered by the natives on the ground; but on being chased it took refuge in a hollow tree, from which they took it alive, all of them declaring that they had never before seen an animal of the kind. This was where the party had commenced the journey up the left bank of the Murray, immediately after crossing that river." Such, Mr. Ogilby remarked, was all the information he possessed at present with regard to this singular animal; but Mr. Gould had promised to examine the original specimen on his arrival at Sydney, in the Museum of which town it had been deposited; and Mr. Ogilby therefore hoped that, through the kindness of that gentleman, he should shortly have it in his power to communicate a more detailed description of its form and characters to the Society.

Mr. Waterhouse afterwards called the attention of the Meeting

to some valuable skins of *Mammalia,* brought from Africa by Capt. Alexander, recently purchased for the Society's Museum.

BOTANICAL SOCIETY OF LONDON.

July 6.—J. E. Gray, Esq., F.R.S., President, in the Chair.

A paper was read by the Secretary communicated by Robert H. Schomburgk, on the *Bertholletia excelsa,* accompanied with drawings of the plant in different stages of its growth. Mr. Gray noticed a peculiarity in the seed vessel, which led to some discussion, after which the Meeting adjourned.

August 3rd.—J. E. Gray, Esq., F.R.S., President, in the Chair.

Specimens of *Polypogon monspeliensis, Poa distans,* and *P. procumbens, Setaria viridis,* &c. were exhibited by Dr. Bossey, collected near Woolwich.—Mr. Anderson also exhibited numerous living specimens of *Utricularia vulgaris* and *Myriophyllum verticillatum,* obtained from the old locality in the ditch around Kew Gardens, which were distributed. The Secretary announced a Donation of British Plants from Dr. T. B. Salter, of Poole, Dorsetshire.

A paper was then read by the Curator Daniel Cooper, A.L.S., being some notes on a large variety of *Ranunculus Flammula,* which he had found near Reigate, and which approached near to *R. Lingua* as regards its habit; the size of the flower however being a sufficient character to consider it as the former species, although the whole character of the herbage resembled much the latter species; the stem varying from 10 to 19 inches in height, and the leaves of considerable size. Mr. C. also observed that the variety of *R. Flammula, β. reptans,* Lightfoot, was exceedingly plentiful on Hampstead and other heaths near London. Mr. Cooper then read the details of the first excursion made by the Members and President of the Society this summer to Woking Common, Surrey, with observations on varieties of the plants then found. He observed that this spot was selected on account of the easy access by the London and Southampton railway. After describing the details of the excursion, it was observed that *Lycopodium Selago* had not been before found so near the metropolis. A variety of *Calluna vulgaris* was also noticed by Mr. Cooper, which appeared to be the *Calluna vulgaris hirsuta,* of Gerard, 1830, and which he considered deserving a place in the recent Floras of Britain, the degree of hairiness forming a sufficient character to warrant its insertion. It is noticed by all the older botanists. A white variety of *Ajuga reptans* was also noticed, together with a very beautiful fawn-coloured variety of *Orchis Morio,* one specimen of which

was only found. The following were the principal plants met with: *Ulex nanus, Carex Oderi, Teesdalia nudicaulis, Lycopodium clavatum* and *Selago, Littorella lacustris* abundant, *Hypericum elodes, Anagallis tenella, Luzula congesta, Trigonella ornithopodioides, Hottonia palustris, Hyoscyamus niger*, &c. &c. Mr. Gray noticed a new structure in the second year's tuber of the root of *Orchis Morio*, which led to some discussion. The meeting then adjourned.

September 7th.—C. Johnson, Esq., V.P., in the Chair.

A paper was read by the Secretary, communicated by the Curator, entitled, "Observations on a new principle of Fencing constructed by Mr. Breese, formed according to the laws of vegetable physiology." It is in fact a natural living fence, and consists simply of growing and planting for the purpose trees or shoots of the same species, or species of the same genus, and causing them to unite by means of the process of "*grafting by approach or inarching.*" A trench being made around the ground intended to be inclosed, the young trees or shoots are then planted in two directions a foot from each other; one set, for example, pointing or sloping towards the north, the other set sloping towards the south. Where they cross each other, the bark is removed on both stems, and the two stems are then tied together. In the course of a few weeks they unite, and a natural living fence is formed, acquiring additional strength every year by the deposition of new wood sent down from the upper portion of the shoot bearing leaves, &c. The advantages possessed by this kind of fence over the one usually employed are numerous. It never requires to be repaired, living wood resisting the action of the weather. It increases in strength annually. It never requires to be covered with tar, &c. It is cheaper in the first instance than ordinary wooden palings. It may be carried up to any height required for fencing. It may be composed of trees, or shrubs bearing fruit, or armed with prickles. The shoots or small trees to be used are reared in a piece of ground appropriated for the purpose, and are kept trimmed and run up to the proper height for the intended fence, when they are transplanted into the trenches as above described in a good earth. The fences which Mr. D. Cooper describes were on the estate of Sir Thomas Neave at Dugman Park, Essex, and were formed of ash.

A communication entitled, "Observations on a variety of *Polygonum aviculare*, called *P. marinum* of Hudson, &c. occurring abundantly in the margin of salt-water ditches in Kent and Essex," was also read from Mr. D. Cooper. The Society then adjourned.

MISCELLANEOUS.

CARDAMINE SYLVATICA, A BRITISH PLANT.

Having been recently led to re-examine our native *Cruciferæ*, I find that I have specimens of this species in my Herbarium, gathered in the dean at Twizel House, Northumberland, the seat of P. J. Selby, Esq. It has been confounded with *Cardamine hirsuta*, of which my specimens are from the neighbourhood of Edinburgh. The former is distinguished by the *latent* pedicels of its pods, which are tipped with a *style, longer than the breadth of the pod*, while in *C. hirsuta* the pedicel is *erect and straight*, and the *style extremely short and obsolete*. See Koch, Fl. Germ. Syn. i. 43.—GEORGE JOHNSTON.

HIMALAYAN *GYPAETOS*.

The species of *Gypaëtos* from the Himalayan range has hitherto been considered identical with that of Europe, both by our British ornithologists and by Mr. Hodgson resident at Nipaul. Lieut. T. Hutton has printed a paper in the Journal of the Asiatic Society of Bengal giving minute descriptions and measurements taken while residing among the mountain ranges of India, and from which he is induced to believe the bird found there to be distinct. "The relative length of the quills, together with the black gorget on the lower part of the neck, furnish *two constant* characters, uniformly foreign to the bearded vulture of authors, and I have therefore ventured to offer it as a distinct species new to science, under the title of

Gypaëtos hemachlanus, supra fusco-niger, subtus ferrugineus, collo obscurior infra pallidior; collo inferiore nigro circumcincto, primoribus rectricibusque cinereis, marginibus nigrescentibus, remige tertio cæteris longiore 3½ poll. primum excedente. In cæteris *G. barbato* similis. Long. 4 ped. Lat. alarum 8 ped. 6 poll.

Journ. Asiatic Soc. Bengal, No. 73, p. 20.

NASTURTIUM ANCEPS, REICHENBACH.

The plant which I have hitherto considered the same as *Nasturtium sylvestre* of British botanists, and which grows all along the sides of the Tweed (between Coldstream and Berwick), appears rather to belong to *Nasturtium anceps* of Reichenbach. See Koch Fl. Germ. Syn. i. 35.—GEORGE JOHNSTON.

ACTION OF FREE CARBONIC ACID ON THE NUTRITION OF PLANTS.

Dr. Schleiden of Berlin has published in Wiegmann's Archiv some observations on the luxuriant development of various plants in water containing carbonic acid. The springs in the valley of Göttingen are

very rich in free carbonic acid, especially the basins near the Wehnder paper-mill, and there is here found a rich and luxuriant vegetation, which in spring appears several entire weeks earlier, and continues in autumn much later than at other spots of the same district. Dr. Schleiden thinks that the free carbonic acid in the water exercises a favourable influence on the vegetation, which certainly may be the case; for observations have shown that by the vegetation of plants in solar light, the addition of a very small quantity of carbonic acid in the surrounding atmosphere produces a much more powerful disengagement of oxygen than takes place in the common atmosphere.—*Meyen's Report for* 1837 *in Wiegmann's Archiv,* Part III. 1838.

HYBRIDITY INFERNS.

M. Martens observed in the Botanical Garden of Louvain, a fern which he regarded as a hybrid between *Gymnogramma calomelanos* and *G. chrysophylla,* to which Bory de St. Vincent proposes to apply the name of *G. Martensii.* At the same time the latter gentleman observes that this hybrid formation appears to occur quite commonly in nature, for he had received several well-preserved specimens of this plant through L'Herminier from Guadaloupe, where it grows in nature between the two above-mentioned *Gymnogrammæ.* He also enumerates several other ferns which might be considered as hybrids, which are only grounded on supposition: to these however Dr. Meyen rather inclines to assent.—*Ibid.*

AFFINITIES OF THE *CERATOPHYLLACEA.*

Mr. Asa Gray has recently published in the 'Lyceum of Nat. Hist.' of New York, a paper on the affinities of the genus *Ceratophyllum*; it appears to him that a great similarity prevails between the embryos of the genera *Ceratophyllum* and *Nelumbium,* which he endeavours specially to demonstrate, and then places the *Ceratophyllaceæ* in the immediate vicinity of the *Cabombaceæ* and *Nelumbiaceæ.* The memoir contains no new observations, nor is there anything new respecting the structure of the *Ceratophyllaceæ.*

Dr. Schleiden in a paper published in one of the late numbers of the 'Linnæa,' admits only one species of *Ceratophyllum,* and calls this *C. vulgare*; a long series of observations are enumerated to prove this view. This paper also contains some remarks on the structure and affinities of this family.—*Ibid.*

STRIPED HYENA, (*H. vulgaris.*)

A litter has lately been bred in the Zoological Gardens at Liverpool. "The animals copulated after being together a fortnight.

The system is most singular. The male continued copulating nearly one hour, but I could not observe that they locked like dogs, and they did not turn as the latter animals do. The time of gestation has been twelve weeks from the first act of copulation; four cubs were produced, which continued blind for nine days."—J. J. Isaacson, *Liverpool Zoological Gardens.*

ON A REPRESENTATIVE OF THE ORDER OF INSECTIVOROUS MAMMALIA BELONGING TO NEW HOLLAND. BY M. GERVAIS.

The animal which is the subject of this note has been recently described in England under the name of *Myrmecobius fasciatus* by Mr. Waterhouse, who considers it as belonging to the class of the *Didelphides,* at the same time noticing the points of resemblance between it and certain Insectivora, and principally with the *Tupaia* or *Cladobatæ.* M. Gervais, insisting on these resemblances, remarks, that, comparing the osseous head of the *Myrmecobius* with that of the *Didelphides,* we find in the existence of two palatin holes (instead of four as in this group of animals), in the arrangement of the ascending branch of the lower jaw, &c., differences which would rather induce us to refer this new genus to the monodelphial mammifera than to the didelphial.—*Compte Rendu,* No. 14, Oct. 1838.

CAOUTCHOUC IN PLANTS*.

The substance caoutchouc is a widely disseminated constituent of vegetable fluids. It has hitherto, I believe, been found only in plants with milky juice, although its presence in all plants yielding such fluid remains to be proved. The presence of caoutchouc in silk has been, I believe, attributed to the nature of the fluids of the plants on which the caterpillars feed; but this, although applicable to the mulberry plants, can scarcely hold good with the various species of *Tetranthera* on which the Moonga feeds, or with the castor-oil plant, the chief food of the Eria, which in Assam does not appear to yield milk. Milky juice is often characteristic of certain families, but often not; its presence is frequently of importance, as it often affords valuable indications of affinity. It is remarkable that it is almost unknown in the grand division of Monocotyledonous plants. The families in which its presence may be said to be universal are *Apocquea, Asclepiadea, Campanulacea, Sobeliacea* and the great division of *Compositæ, Chicoracea,* of which the lettuce is a familiar example. It is of common occurrence in *Euphorbiacea* and *Tulicea,* which orders may be looked on as the grand sources of caoutchouc.

* From Mr. Wm. Griffith's Report. Journ. of the Asiatic Soc. of Bengal.

Thus, in addition to our Indian plants, the American caoutchouc is supposed to be produced by *Cecropia peltata*, which belongs to *Urticea* and the ule tree of Papantla, from which the caoutchouc of that country is obtained, is supposed to belong to the same orders. I must, however, observe that Baron Humboldt objects to the supposition of *Cecropia peltata* yielding the American caoutchouc, as its juice is difficult to inspissate*.

The order *Euphorbiacea* would likewise appear to supply a large quantity. Thus Dr. Lindley informs us that the true caoutchouc is furnished by *Siphonia elastica, Hevia quiancusis* of Aublet, a Surinam and Brazilian tree ; and it is from a tree of this order that a substance resembling caoutchouc is procured in Sierra Leone.

Some *Apocqueæ* are also reported to produce good caoutchouc†; thus *Aricola elastica* produces the caoutchouc of Sumatra, and it is from this plant that caoutchouc has been produced in Penang and exported to England ‡. *Willughbeia edulis* is likewise an Indian plant from which caoutchouc has been produced, but Roxburgh says it is of indifferent quality : unless I have been misled, good caoutchouc is obtained from *Nerium grandifloreum* of Roxburgh.

It is probably equally abundant in *Asclepiadea* ; one plant of which order *Cynanchum albifloreum* has been stated to yield it of excellent quality in Penang. Mr. Royle seems inclined to attribute the great tenacity of the fibres of some plants of both these orders to its presence, but this supposition seems to me of very doubtful accuracy §.

OBITUARY.

The death of the Chevalier Frederic Cuvier (the news of which reached us some time ago) has awakened the deepest regret among a numerous circle of friends and savans. This excellent man was on his return to Paris, from one of those annual journeys which his office of Inspector General to the University obliged him to make, and was seized with paralysis at Strasbourg ; the alleviation is contained in the reflection that he was in this city surrounded by friends and the best medical aid, but neither affection nor skill could avail, and in four days he was no more. He was born at Montbéliard, in 1773, was called to Paris by his illustrious brother, Baron George Cuvier, and became keeper of the Ménagerie at the Jardin des

* Lindley's Introduction to Natural System of Botany, p. 176.

† Lindley's Instructions, p. 300.

‡ Royle's Illustrations, p. 329, under *Euphorbiacea*, and p. 270, under *Apocquea*.

§ Royle's Illustrations, p. 274.

Plantes in 1804, a place which enabled him to make some precious observations on the œconomy and physiology of animals. These are published in the 'Annales du Muséum,' and, with other valuable works on natural history, led to his election into the Academy of Sciences, to the Inspector Generalship of the University, to the Legion of Honour, to the Royal Society of London, and lastly, to the chair of comparative physiology at the Jardin des Plantes. A remarkable coincidence exists between his death and that of his brother; like him, he was about to deliver a fresh course of lectures, was attacked by paralysis, was aware from the first moment of the result which must ensue, was anxious to secure the welfare of others, was patient under severe sufferings, and was ready to meet his God. As a scientific man his loss will be severely felt, for not only did he write the above-mentioned works, but was a contributor to several of the journals of science, and the principal labourer in the 'Histoire des Mammifères,' published in conjunction with M. Geoffroy St. Hilaire. As a father, a friend, and a brother to the bereaved widow, who is thus again visited by heavy calamity, his loss is irreparable, and as a master, the very quadrupeds of the Jardin will feel the loss of his benevolent cares. M. Cuvier has left a son, who bears his noble name with honour.—*Athenæum.*

METEOROLOGICAL OBSERVATIONS FOR SEPTEMBER 1838.

Chiswick.—Sept. 1—3. Very fine. 4. Foggy: very fine. 5. Fine: rain. 6. Heavy rain. 7. Showery. 8. Cloudy and cold. 9—12. Very fine. 13, 14. Overcast and fine. 15. Hazy: very fine. 16, 17. Foggy in the mornings: very fine. 18. Fine: overcast. 19. Rain: very fine: drizzly. 20. Cloudy. 21, 22. Foggy: very fine. 23. Slight rain: fine: rain at night. 24. Foggy: heavy rain. 25. Hazy. 26. Foggy: fine. 27. Rain. 28. Foggy: fine. 29. Foggy: rain. 30. Very fine.

On the evening of the 16th, about 8 P.M., a luminous arch was observed ascending from the west and proceeding in an easterly direction; terminating in the zenith, but with an attenuated broad train, bending towards the south.

Boston.—Sept. 1, 2. Fine. 3. Cloudy. 4, 5. Fine. 6. Rain. 7. Fine: rain A.M. 8. Cloudy. 9—12. Fine. 13—15. Cloudy. 16. Fine: lively appearance of northern lights 8 P.M. 17, 18. Cloudy. 19. Fine: rain early A.M. 20, 21. Fine. 22. Foggy. 23. Cloudy: rain at night. 24—26. Cloudy: rain P.M. 27. Rain. 28. Fine. 29, 30. Foggy.

Applegarth Manse, Dumfries-shire.—Sept. 1. Temperate. 2. Shower A.M.: fair P.M. 3. Fair A.M.: wet P.M. 4. Showery great part of the day. 5. Wet all day. 6. Dripping day. 7—9. Fine harvest days. 10. Cloudy. 11. Cloudy: moist P.M. 12. Showery throughout. 13. Dull: moist. 14. Moist and warm. 15. Mild: warm. 16. Fine harvest day: Aurora. 17. Fine harvest day. 18. Fair till 6 P.M. rain. 19. Fair A.M.: rain. 20. Fair till 3 P.M.: rain and thunder. 21. Fair till 5 P.M.: rain. 22. Showery all day. 23. Fair all day. 24. Dripping day: cold. 25. Very moist. 26. Remarkably fine. 27. Very mild: warm P.M. 28. Fine harvest day. 29. Rather moist. 30. Fine harvest day.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. Roberton; *by* Mr. Thompson *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. Veall *at Boston, and by* Mr. Dunbar *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1838. Sept.	Barometer.						Thermometer.								Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick. 1 p.m.	Bost.	Dum-fries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	9 p.m.	Fahr. 9 a.m.	Self-register. Max.	Self-register. Min.	Max.	Min.		9 a.m.	9 p.m									
1.	30·108	30·111	30·076	29·49	29·92	29·97	61·0	69·5	54·0	73	54	60·5	56	52	W.	NW.	W.	NW.	...	·04	...	...	56
2.	30·140	30·201	30·123	29·52	29·97	30·04	61·5	68·5	57·0	71	45	60	56	48	NW.	W.	NW.	W.	·030	...	...	...	55
3.	30·190	30·189	30·090	29·58	29·99	29·98	60·0	68·0	53·0	73	38	59	50½	52½	SW.	W.	calm	W.	...	...	...	...	53
○ 4.	29·998	29·994	29·636	29·43	29·86	29·75	59·0	69·0	52·0	76	43	60	56	52	SSW.	S.	calm	S.	...	...	...	...	55
5.	29·612	29·605	29·374	29·01	29·51	29·37	64·0	69·0	59·8	75	56	63·5	56	52	S.	SW.	W.	SE.	...	·30	...	1·35	61
6.	29·290	29·321	29·272	28·68	29·26	29·20	59·2	69·0	58·0	75	54	59	56	51	SSW.	SW.	W.	NE.	·372	·14	·08	...	59
7.	29·344	29·473	29·318	28·80	29·33	29·57	63·5	64·5	57·4	70	50	60	49½	47½	S.	S.	W.	N.	·050	·10	·13	...	60
8.	29·640	30·058	29·627	29·14	29·76	29·93	52·0	68·0	52·0	56	35	52·5	49½	44	NNE.	N.	N.	NNW	·036	...	·11	...	51
9.	30·220	30·370	30·207	29·64	30·11	30·22	51·5	56·0	44·5	63	36	48	47½	42½	SW.	NW.	calm	SW.	...	...	...	...	46
☽ 10.	30·406	30·549	30·401	29·93	30·33	30·42	51·5	59·5	46·5	68	34	48	48	46	NW.	W.	calm	W.	...	...	...	...	49
11.	30·548	30·547	30·543	30·02	30·42	30·35	48·7	59·5	45·0	70	37	52	46½	52	NW.	W.	calm	S.	...	...	...	...	47
12.	30·500	30·515	30·418	29·93	30·30	30·26	53·2	60·0	47·5	72	44	57	56	56	SW.	W.	calm	SW.	...	...	...	0·30	50
13.	30·328	30·341	30·235	29·74	30·15	30·00	57·8	65·0	51·5	66	43	59	56	56	W.	SW.	calm	SW.	...	...	...	...	53
14.	30·146	30·149	30·069	29·57	29·99	29·98	61·0	64·0	52·5	69	56	58	58	52	SW.	W.	calm	SSW.	...	...	...	...	55
15.	30·088	30·082	30·057	29·53	30·00	30·02	59·5	65·0	59·0	70	39	63	54	58	NW.	NW.	calm	S.	...	...	...	...	59
16.	30·078	30·105	30·037	29·55	30·03	30·05	55·8	65·2	50·8	74	48	57	60	54	N.	NE.	calm	S.	...	...	...	...	55
17.	30·072	30·121	30·037	29·56	30·11	30·11	59·3	67·7	55·3	70	50	58	57½	47	NNE.	E.	E.	EbyS	...	...	...	...	55
● 18.	30·056	30·040	30·017	29·59	30·10	30·00	57·3	67·8	52·4	64	52	56·5	50	46	NE.	NE.	calm	EbyS	...	...	...	...	54
19.	29·948	29·942	29·845	29·29	29·90	29·70	54·4	60·4	54·6	63	52	57	52	52	NNW.	NW.	W.	SSW.	...	·05	·01	0·47	53
20.	29·858	29·941	29·845	29·34	29·68	29·70	57·6	58·6	54·6	68	35	51	50	48	SW.	NW.	calm	W.	·022	...	...	...	54
21.	29·850	29·977	29·854	29·35	29·80	29·85	50·7	63·8	46·3	68	36	51	48	46	S.	NW.	calm	SW.	...	...	...	...	49
22.	30·000	30·005	29·893	29·50	29·84	29·70	53·7	60·2	42·8	69	49	48	50½	52½	SSW.	SW.	calm	S.	...	·01	...	...	50
23.	29·918	29·928	29·866	29·29	29·63	29·70	57·6	60·6	52·7	69	45	59	54	52	S.	NE.	W.	SW.	...	·10	...	...	54
24.	29·918	29·920	29·750	29·44	29·81	29·83	54·7	63·7	51·0	56	49	52	56	49½	N.	W.	calm	SW.	·038	·75	·13	...	53
25.	29·820	29·940	29·734	29·30	29·87	29·89	51·6	56·3	50·4	58	42	55	52	50	W.	W.	calm	NNE	·750	·01	·41	...	52
☾ 26.	29·988	29·982	29·975	29·53	29·87	29·92	48·8	55·3	47·3	58	48	51	52	50	SSW.	NE.	calm	S.	...	·01	·10	...	52
27.	29·864	29·933	29·841	29·46	29·92	29·85	52·6	58·3	49·2	59	40	53·5	54	50½	NW.	NW.	calm	S.	·116	·55	·23	0·58	53
28.	30·000	30·072	29·975	29·48	29·93	30·00	46·3	54·7	45·0	65	51	49	52	54	S.	E.	calm	E.	·783	...	·62	...	47
29.	30·016	30·138	30·014	29·58	30·00	30·02	56·3	61·0	46·5	60	54	51	54½	50	N.	E.	calm	S.	...	·02	...	...	53
30.	30·200	30·303	30·197	29·68	30·16	30·29	57·8	59·2	56·4	64	43	51	52½	52	NW.	N.	calm	S.	·050	...	...	...	53
Mean.	30·005	30·061	29·944	29·46	29·92	29·92	55·9	62·6	51·5	67·06	45·26	55·3	53	50½					Sum. 2·247	2·08	1·82	2·70	Mean. 53·2

ANNALS OF NATURAL HISTORY.

XXVII.—*Remarks on the Greenland and Iceland Falcons, showing that they are distinct Species.* By John Hancock*.

[With a Plate †.]

THE Grey or Iceland Falcon (*Falco Islandicus*, Lath.) and the White Gyr (*Falco Gyrfalco*, Linn.) are at present considered, I believe, by most English authors as one species. Continental writers however disagree much on the subject; some assert that they are perfectly distinct; whilst others contend that they are the same species, varying only in consequence of age, sex, or climate. It seems strange that any difference of opinion should exist respecting species so characteristically marked as are those two birds. Our English naturalists, it is true, have had few specimens to examine, or at all events our public collections contain very few individuals; and judging from the scarcity of the species, it is not likely that many specimens have found their way into private cabinets. This is not the case with continental writers; they have been more fortunate in having numerous specimens before them, but by assuming that these birds go on changing their plumages year after year for a long period, they have been led into much confusion, and have not yet arrived at any satisfactory conclusion. This being the state of the question, and having recently had many opportunities of examining individuals of both the Iceland and the Greenland birds, I wish to lay before this meeting the result of such examination, more particularly as I feel a strong conviction that these birds are perfectly distinct. That my reasons for so considering them may be as clearly understood as possible, I shall, in the first place, detail what led me to this conviction. I shall then make some remarks by way of elucidation, and afterwards de-

* Read in the Natural History Section of the Meeting of the British Association, Newcastle, and communicated by the author.

† This plate will be given in the Supplement to the present volume.—Edit.

scribe the two species in their various plumages. My attention was first drawn to the subject so far back as 1833 by two specimens brought from Iceland by Mr. Geo. C. Atkinson as the young of the Greenland or white species; one of those is now in my possession, and I am satisfied is a mature female of the true Iceland bird. At the time I was convinced that this was not an immature bird; the cordated markings on the breast and the transverse bars on the flanks were sufficient to prove this fact, and it was impossible for a moment to suppose that a bird so symmetrically and characteristically marked should be a mere variety of the Greenland or white falcon. I believed it to be a distinct species, and subsequent observations have confirmed me in this belief. I was afterwards fortunate enough, through the kindness of my friend Mr. Warham, of the Lord Gambier whaler from this port, to possess a bird from Davis' Straits, which is undoubtedly the young of the white bird; in fact it has already got a quill feather of the mature dress. This individual has longitudinal dashes or blotches on the under parts; a character indicative of youth in the *Falconidæ*, and which in this instance is perfectly analogous to the markings of the young of the peregrine falcon, a species most nearly allied. Afterwards I became possessed of another young bird which was shot in Yorkshire, March 1837. This has also the longitudinal markings on the under parts, and as might be expected, from the time it was taken, has commenced to shed its feathers, and has already got several new ones on different parts of the body. The fresh feathers are precisely similar to those of the bird from Iceland which I considered to be mature. This then was certainly the young of the Iceland bird. It differs from the young of the white bird in one striking particular, viz. that in having the bars on the two middle feathers of the tail *non-continuous*, or not opposing each other, whilst they are continuous in the young of the latter. (Pl. X. figs. A. and F.) All that was now wanting was to discriminate the sexes. I was enabled to do this through the kindness of Mr. W. Proctor, Curator of the Durham Museum, who visited Iceland last year for the purpose of procuring birds, and the other natural productions of that island. After the most indefatigable exertions he obtained five individuals of the true Iceland falcon. He shot them

all on the same crags. They are a brood with their two parents; there can be no doubt of this, for he saw the old birds bring food to the young ones, and he afterwards found in the same cliffs, and close to the spot where the birds were killed, an old nest which contained in the bottom of it a rotten egg buried in dung. Four of these birds were shot on the same day, the fifth was killed on the following: it was perched near to the nest. I had no difficulty in separating the old from the young, or of naming the sexes. Mr. Proctor's notes taken in Iceland afterwards proved that I was correct. The old female agrees exactly with the individual brought by Mr. Geo. C. Atkinson from Iceland. The male is similar to the female, only that he is a little brighter in colour, and like the rest of the falcons, is considerably smaller. The young are of course in the nest plumage (they were shot on the 3rd of August) and agree most accurately with the individual taken in Yorkshire, except that the plumage of the latter is a little faded on account of its greater age. It had undergone six months or upwards extra bleaching. The fading of the plumage is common to all birds. I possess a young peregrine which was shot previous to its moulting, and it is bleached down from the deep brown of the nest plumage to the colour of brown paper. All the young have the bars of the tail non-continuous, and another immature bird which Mr. Proctor also procured in Iceland has the same character. This peculiarity has likewise been observed by Benwicke, who says, in describing a young bird from Iceland, that "the bars of the tail are non-continuous." I had now before me male, female, and five young of the Iceland or grey species, and on examining these with the male, female, and young of the white or Greenland species, no doubt could exist, and the conclusion was easily arrived at, that the difference of these two birds is not at least the effect of sex or age, unless we adopt the theory common amongst ornithologists, that these birds go on varying in plumage for a series of years, even after they have attained their nuptial dress. This however I shall afterwards show is not the case. Faber, who resided some time in Iceland, and who is apparently well acquainted with the species of that island, can find no other way of escaping the necessity of acknowledging it to be a species, than by supposing that the

white or Greenland bird is "either an Iceland falcon in a very advanced age, or what" he is "much rather disposed to believe, an albino variety." With regard to the former part of his supposition, there is nothing that I am aware of in the history of the *Falconidæ* to warrant such an assumption. They do not, like most birds, shed the nest plumage in autumn, but retain it until the following spring, when they get the mature dress, and I know of no instance of any subsequent change of importance. This is the case with the peregrine falcon, which is very closely allied to the Iceland species. This fact is well known to falconers, though I believe doubted by many ornithologists. Capt. Bonham of the 10th Hussars, who has for many years kept a number of peregrines, showed me an individual which had got its mature plumage, and it was then only a year old. It had retained its nest plumage until the spring, when it moulted and at once assumed the mature dress, and he assured me this was always the case. This also takes place with the kestrel (*Falco Tinnunculus*, Linn.), and I believe with all the true falcons: occasionally the plumage may afterwards become a little brighter, but never any material change takes place; the markings retain their characters, and though the bird may be considered a finer and more distinctly marked individual, yet the plumage is identically the same in all essential points. We possess, however, the strongest proof that this is the case with the Iceland species. The Yorkshire specimen, though in the nest plumage, has, as before remarked, got several new feathers which are exactly like those of the adult, breeding individuals from Iceland; thus we have a proof that this species gets the *mature plumage immediately on shedding the nest feathers*; and in the two old birds we have evidence of the strongest nature that their plumage undergoes no further change, for it fortunately happens that they are also in the process of casting their feathers, and those that are *coming* are perfectly similar to the feathers of the previous year. Nothing can be more decisive. It needs no comment. The Iceland species then does not change after it has *attained* the breeding dress. Faber also remarks, that the Iceland bird is not mature, that is, it does not breed until it has got yellow legs: this is probably the fact; then if he be correct in supposing that the white or Greenland species is only an Iceland

bird in a very advanced age, how does it happen that white birds are found with blue legs? This very commonly occurs, and is characteristic of youth. The truth is, that these specimens with blue legs are birds of the previous spring and have just cast their grey or nest plumage, and have not yet attained the mature colouring of the feet; I have several specimens in this state, some of which are already changing to yellow. The want of this colour on the feet is one proof that the individual is young, and the spots on the breast of such specimens are generally more numerous and larger. The young of both species have the feet *blue at first*; they afterwards become of a full *bright yellow* in the Iceland bird, though it remains grey. This is not the case with the Greenland species, it *becomes white* before the *legs* are *yellow*, and they never attain the bright colour of the former, but continue of a pale livid yellow. The latter part of Faber's supposition needs scarcely any remark. It seems absurd to imagine a bird so symmetrically marked as the Greenland species, to be a mere variety. It is as characteristic in its appearance and varies as little as any of its congeners. There is no analogy whatever between this bird and those with which he compares it. The albino varieties of those birds to which he alludes occur perhaps one in a hundred. The Greenland or white bird, on the contrary, is more plentiful than the Iceland or grey. The exception, therefore, would be more numerous than the rule, an anomaly of no very common occurrence; and again, albino varieties are either entirely white or are entirely white in irregular patches, but the Greenland falcon is symmetrically marked, as before mentioned, and never becomes entirely white, and it varies from the Iceland bird not only in being whiter, but also in the markings of the plumage. In the former the feathers on the upper parts are white with arrow-shaped spots of dark, in the latter the upper plumage is slate colour or grey with lighter spots and bars. (Pl. X. figs. D. C. and G.) Perhaps it might be asked, is there not a white variety of the Iceland bird as well as a Greenland species? I believe not. I have a white individual from Iceland, and there is no perceptible difference between it and the many specimens I have seen and possess from Davis' Straits. In

fact there can be little or no doubt that the white one never breeds in Iceland, and that the individuals shot there are driven from their more northern haunts by the severity of the climate during the winter months. This view of the case is corroborated by a remark of Faber, who says, "I only met with white birds in winter, and these on the northern parts of the island (speaking of Iceland)"; and again, "The white variety is rather rare; I have met with it only in the winter months." And Mr. Proctor when there made frequent inquiries about the white gyr, and always received for answer that they were extremely rare. He at length, however, procured a skin from one of the natives, who said the bird was shot during the winter season. It appears to be doubtful whether or not the Iceland species inhabits Greenland. Fabricius and others, it is true, described grey birds as belonging to these regions, but it is difficult to say whether these are the young of the white gyr or are the Iceland *species*. From what I can learn I am very much inclined to think that this which I suppose to be a species is not a resident of those more northern countries, or at least is not common there. Messrs. Warham and Taylor, Captains of Davis' Straits whalers from this port, inform me that they see only white birds during the early part of the season, and it is not until the latter end of the year that grey ones make their appearance. This is just what might be expected, when we recollect that this bird, like its congeners, undoubtedly gets its mature dress or breeding plumage at the first moult: the nestlings of the previous season get the white plumage before the whalers arrive, and as they do not leave the fishing grounds until autumn, they then meet with the young of the year in the grey or nest plumage.

Brehm, who attempted to divide the two species, was unfortunate in possessing only young birds; this is apparent from his describing the Iceland bird as having blue legs, whilst its legs in a mature state are full yellow. He could never have met with the old bird or he could not have fallen into this error. Benwicke appears also to have laboured under the same mistake at the time he believed there were two species, for he described the one with *yellow legs* and dark spots on a white ground, the other with white spots on a dark ground

and *blue legs*, evidently considering the mature Greenland falcon as the one species and the young either of this or the Iceland bird as the other. He afterwards, however, united them, and believed he had obtained a thorough knowledge of the subject. He continues nevertheless in error. He describes the nest plumage no less than three times over as different ages. The first is from Iceland, and has the bars on the tail *non-continuous*, like the individuals I possess from that island. The other two are from Greenland, and vary very slightly, one having only a little more white than the other. This is of no importance whatever; all species are liable to vary in this way, and the young birds from the same nest brought by Mr. Proctor from Iceland vary as much or more than do those two which he has described as birds of different years. He afterwards described the mature Greenland falcon, but never mentions the mature Iceland: from this it is probable he had never seen it. Temminck, however, is acquainted with both species, but describes the mature Iceland falcon as the female of the Greenland bird. In this he is most certainly wrong, for I possess both the sexes of the mature Greenland bird, and the only difference perceptible is that the male is perhaps a little whiter. The markings are perfectly of the same character; and as we have before us male and female of the Iceland species, nothing more need be said on this head; and in fact Faber has settled this point of the question, for he has shown that the plumage of the Greenland bird is not occasioned by sex. Before I conclude I have to acknowledge my obligations to Dr. Charlton of Hesleyside for extracts from various German works and for the loan of others.

I shall now close this paper by describing the two species in their various plumages. I have retained Latham's name of *Islandicus* for the true Iceland species, as the most appropriate, it being, as far as I am aware, peculiar to that island, though I am much inclined to believe that the birds Audubon figures and describes as the Iceland or ger falcon is the young of this species, and the other species cannot perhaps be better named than after the country from which it is most abundantly procured. I therefore continue Linnæus' name of *Grœnlandicus*, which he gave the young bird.

Falco Islandicus. Ground of the upper plumage a dark

lead or mouse colour, barred and spotted with cream colour; under parts the ground is buff, marked with streaks, heart-shaped spots, and bars of dark mouse colour. Wings reaching to within about 1½ in. of the end of the tail.

Iceland falcon. *Pen. Arc. Zool.*, Addenda C, vol. i. p. 252.
Greenland falcon. *Pen. Arc. Zool.*, Addenda D, vol. i. p. 257.
Collard falcon, *Pen. Arc. Zool.*, vol. i. p. 158.
Falco gyrfalco, *Tur. Linn.*, vol. i. p. 158.
Iceland falcon. *Lath.* No. 50.

Dimensions. *Adult male,* length 1 ft. 9 in.; extent of wings 3 ft. 10 in.

Description. Bill lead colour, gradually darker towards the tip, with *two processes* in the upper mandible; irides dark brown; cere, orbits and feet bright yellow; crown, occiput, and cheeks cream colour, streaked with dark grey or mouse colour. The feathers of the upper parts dark slate colour, with two or more transverse cream-coloured bars sprinkled with ash, the bars increasing in number as the feathers increase in size, each feather with a narrow edging of the same; primaries several shades darker, with fourteen cream-coloured bars on the inner webs, with a few less conspicuous and broken bars on the outer webs. Tail rounded, consisting of twelve feathers of a dark grey, crossed with twelve or thirteen bars of cream colour mottled with ash; throat nearly white; breast and belly cream colour or buff, the former streaked and the latter marked with heart-shaped spots of the ground colour of the back; the flanks and under tail coverts transversely barred as in the peregrine, but the bars less numerous.

Dimensions. *Adult female,* length 1 foot 11 in.; extent of wings 4 feet 2 in.

Desc. In every respect like the male, excepting that she is considerably darker.

Young or nest plumage: bill, cere and legs dark blue; crown of the head and occiput cream colour, streaked with dark brown; the whole of the upper plumage the same, edged with cream colour, with a few spots of the same on the lower parts of the scapulars and greater wing coverts; under parts cream colour, marked longitudinally with closely set dark brown blotches, increasing in size on the vent and flanks;

thighs streaked with the same; tail dark, with about ten ash-coloured bars (in some specimens these bars are cream colour), the bars on the two middle feathers *non-continuous*.

Falco Grœnlandicus. Ground of the plumage pure white; upper parts elegantly marked with arrow-shaped spots of a dark grey; under parts and head streaked with the same; wings reaching to within 2 inches of the end of the tail; second primary the longest.

Gyr falcon. *Pen. Arc. Zool.*, vol. i. p. 232.
Falco Grœnlandicus. *Tur. Linn.* (this is the young), vol. i. p. 117.
Falco islandicus. *Tur. Linn.*, vol. i. p. 155.
Falco candicans. *Tur. Linn.*, vol. i. p. 158.
Iceland falcon, var. *Lath.*, p. 71.
Spotted Iceland falcon, var. *Lath.*, p. 71.

Dimensions. *Adult male,* length, 1 foot 9 in.

Desc. Bill light horn colour, inclining to yellow, with the tip darker and a large process in the upper mandible; cere, orbits, and feet pale yellow (in some specimens the upper parts of the toes are blue); ground of the whole plumage pure white; crown streaked with narrow lines of dark ash; on the occiput the streaks are a little larger, forming an obscure patch of darker. The feathers on the back scapulars and lesser wing coverts are deeply margined with white, the centre being dark ash; in some the dark occupies the whole of the centre, in others (especially towards the lower parts) it is broken up into bars, sometimes on the outer web and sometimes on the inner; the markings are arrow-shaped at the tip; wing coverts, secondaries and primaries barred, the bars increasing in number in proportion as the feathers increase in size; towards the tip of each of the primaries the dark bar is considerably larger, forming a spot at the tip of the wing; this is very conspicuous when the bird is flying: the tail is rounded at the end, and consists of twelve feathers, which are white, except that the two middle ones are barred a little on each side of the shaft; in some specimens all the feathers are barred, and in others they are all white; all the under parts pure white, excepting a few dashes of dark ash on the flanks.

Dimensions.—*Adult female,* length, 1 foot 11 in.; extent of wings, 3 feet 10 in.

Desc. In every respect like the male, except that the dark

is a little more in proportion to the white, and in some individuals the bill is furnished with two processes in the upper mandible, like the young of the preceding species, except that the bars on the two middle feathers in the tail are continuous.

Note.—The day after the above paper was read, two mature specimens were received from Iceland; they are male and female, and have just come through the moult, and correspond exactly in the markings with the breeding individuals brought by Mr. Proctor; they are, however, a little brighter in colour, occasioned principally by the freshness of the plumage, and certainly do not vary more than might be expected from the difference in the young from the same nest. I may also observe that all the mature specimens I have seen from Iceland, amounting to *seven* in number, have the upper mandible furnished with two processes; whilst in the many Greenland specimens I have examined, only two have had the double process, and these were apparently very old individuals.

EXPLANATION OF THE PLATE.

A. Tail-feather of young *Falco Islandicus*. B. Primary of mature ditto. D. Lesser wing-covert feather of ditto.

E. Primary of mature *Falco Grœnlandicus*. F. Tail-feather of young ditto. G. Covert feathers of mature ditto.

XXVIII.—*On the Land and Freshwater Mollusca of Algiers and Bougia.* By Edward Forbes.

[With Plates*.]

During a visit to the regency of Algiers in May 1837, I obtained forty-five species of land and freshwater Mollusca, chiefly collected in the neighbourhoood of the city of Algiers and of the town of Bougia (in the province of Constantine). M. Michaud, a distinguished French naturalist, published the year before a pamphlet entitled, 'Catalogue des Testacés vivans envoyés d'Alger, par M. Rozet,' in which he enumerates twenty-five species of land and freshwater shells; but a great part of these are not correctly speaking from Algiers, but from Oran (near Morocco), where the Fauna of Barbary assumes a different aspect, approximating to that of the Canaries on the one hand, and to that of Spain on the other.

* These plates will form part of the Supplement.

Of the shells enumerated in M. Michaud's Catalogue, I believe the following do not occur either in the province of Titérie (Algiers) or in that of Constantine. *Helix cariosula, soluta, alabastrites,* and *Hieroglyphicula* (all new species of M. Michaud), *Helix vermiculata, Carthusiana, albella, zaphirina,* and *conspurcata. Bulimus radiatus, Cyclostoma Voltzianum* (new) and *ferrugineum* (new).

Among the forty-five species collected by myself, there are several which I have reason, after careful research, to believe undescribed, and have accordingly given them names except in the case of two species of *Limax.*

Limax.

1. *Limax cinereus.* Gardens near Algiers.

2. *Limax* ——, with the body rounded, head and tentacula purple-grey, the back with two dark parallel stripes. Shield yellowish-grey, with two dark longitudinal stripes, not continuous with those of the body. Length, an inch and a half. At Bougia and on the hill of Budjaria near Algiers.

3. *Limax* ——, with the back sharply carinate, grey; tentacula dusky; shield brownish-white, with grey markings. Length, one inch. At Bougia, rare.

Helix.

4. *Helix aspersa,* Mull. Common at Algiers and Bougia. The colouring of the shell generally more vivid than in the European specimens and the size greater.

5. *Helix melanostoma,* Drap. Algiers, rare.

6. *Helix naticoides,* Drap. Not common at Algiers. Frequent at Bougia, where it abounds on nettles, coming out from its retreat after a shower of rain. Grows to a larger size than in Europe.

7. *Helix lactea,* Mull. Thickets about Algiers; common.

8. *Helix Constantina,* nov. sp. Pl. XI. fig. 1.

H. testa subglobosa, imperforata, alba, rufo-fasciata; fauce alba: labro expanso, margine reflexo; columella gibba.

Animal purplish-grey; foot yellowish-white; tentacula long, slender. In waste places among nettles at Bougia.

9. *Helix candidissima,* Drap. On the hill of Budjaria near Algiers, abundant.

10. *Helix Otthiana*, nov. sp. Pl. XI. fig. 2.

Helix orbiculato-depressa, alba, longitudinaliter striata, profunde umbilicata: anfractibus quinque, ultimo carinato marginato; apertura angulata, peristomate subreflexo; columella reflexa.

Breadth 1 inch; height $\frac{1}{4}$.

Animal very dark grey; tentacula short, obtuse. On rocks at Bougia, abundant. I have named this very distinct species after my friend and companion in travel Dr. Otth of Berne.

11. *Helix Terverii*, Michaud. Animal bluеish-grey above with four darker longitudinal stripes; tentacula bluеish-grey.

On the *Chamærops humilis* at Algiers and Bougia in great abundance.

12. *Helix cæspitum*, Drap. Algiers, frequent.

13. *Helix pisana*, Mull. Algiers, abundant on the aloes near the sea-shore.

14. *Helix variabilis*, Drap. Algiers and Bougia, common.

15. *Helix pyramidata*, Drap. On Mount Budjaria near Algiers, and at Bougia, plentiful.

16. *Helix conoides*, Drap. On the aloes at Algiers.

17. *Helix conica*, Drap. Sandy places by the sea at Algiers.

18. *Helix elegans*, Drap. At Bougia, abundant.

19. *Helix Rozetti*, Michaud. Animal yellowish-white, with four grey longitudinal stripes; tentacula grey. Under stones on Mount Budjaria.

20. *Helix lenticula*, Ferr. Under stones at Algiers and Bougia.

21. *Helix lucida*, Drap. Two specimens from the rejectamenta of the river Haresh, near Algiers.

22. *Helix cellarea*, Mull. On old walls at Bougia, a remarkably flattened form.

23. *Helix apicina*, Lam. Under stones by the sea at Algiers. This species is sometimes hairy.

24. *Helix roseo-tincta*, nov. sp. Pl. XI. fig. 3.

Helix orbiculato-convexa, depressiuscula, pallide cornea, pellucida, perforata, pilosa, pilis per series longitudinaliter dispositis; apertura subrotunda, labro interne marginato, roseo-tincto, peristomate simplici; apice glabro, papillato.

Br. $\frac{1}{2}$ inch; height $\frac{3}{10}$.

Var. β. lævis.

Animal (of both varieties) slender, yellowish-grey; upper tentacula slender, dark towards the apex; lower tentacula grey; tail acute. On rocks near Algiers, and on walls at Bougia.

Bulimus.

25. *Bulimus decollatus*, Drap. Not rare at Algiers. Common at Bougia; at Monkey mountain near Bougia the crevices of the rocks are often filled with broken shells of this species and *Achatina Poireti*, perhaps collected by the monkeys for food. The *Bulimus decollatus* grows to a much larger size in North Africa than in Europe. I have specimens an inch and a half long.

26. *Bulimus acutus*, Drap. Common at Algiers and Bougia.

27. *Bulimus ventricosus*, Drap. In moist places on the plain of the Metidja, but not so frequent as the last species.

28. *Bulimus pupa*, Farr. Common at Algiers. The animal is of a uniform dark grey colour.

29. *Bulimus Terverii*, Dupotet, Pl. XII. fig. 1. MSS. A very distinct and interesting species discovered near Bougia by Capt. Dupotet, and named by him after M. Terver of Lyons. In form it connects *Bulimus acutus* with *Bulimus obscurus* and *montanus*. Its colour is corneous with white irregular longitudinal stripes. I have taken it from the surface of rocks at Mount Goriah near Bougia.

Achatina.

30. *Achatina Poireti*, Ferr. (A. algira, *Philippi*; Bulimus algirus, *Brugière*.) Rare at Algiers; more frequent at Bougia. The animal is of a bright orange colour.

31. *Achatina acicula*, Lam. Among the rejectamenta of the river Haresh.

32. *Achatina follicula*, Lam. Frequent at Algiers, under stones, in dry places. Animal yellow with the upper tentacula and two longitudinal stripes on the back dark grey.

33. *Achatina nitidissima*, nov. sp. Pl. XII. fig. 2.

Achatina testa cylindracea, pellucida, lævissima, nitidissima, corneo-lutescente: apertura oblonga: anfractibus quinis, ultimo majore: apice obtuso.

Length $\frac{1}{4}$.

Animal yellow with the back and tentacula grey. Allied to *Achatina folliculus*, but very distinct. The young shell not nearly so ventricose, and the adult much more attenuate. In mossy places and among leaves at Algiers and Bougia.

SUCCINEA.

34. *Succinea amphibea*, Drap. I found dead specimens of this species among the rejectamenta of a rivulet near Algiers.

PUPA.

35. *Pupa umbilicata*, Drap. Among the rejectamenta of the river Haresh. It probably inhabits the mountains of the Lesser Atlas.

36. *Pupa granum*, Drap.? Under stones on Mount Budjaria near Algiers, rare.

CYCLOSTOMA.

37. *Cyclostoma sulcatum*, Drap. Common at Bougia.

PALUDINA.

38. *Paludina acuta*, Drap. In rivulets near Algiers, rare.

39. *Paludina Dupotetiana*, nov. sp. Pl. XII. fig. 3.

P. testa minima ovato-conoidea, ventricosa perforata, fusca; anfractibus quinis teretibus: apertura ovato-rotunda; spira obtusa.

Long. $\frac{1}{10}$; lat. $\frac{1}{12}$.

Animal black. The shell is generally encrusted with mud; the operculum is corneous and striated. In muddy rivulets near the sea at Algiers and Bougia. I have named this little species after Captain Dupotet of the 2nd African Legion, to whose kindness I owe many interesting species, and whose researches will doubtless throw much light on the zoology of French Africa.

ANCYLUS.

40. *Ancylus fluviatilis*, Drap. Common in rivulets both at Algiers and Bougia.

PHYSA.

41. *Physa contorta*, Michaud. In a fountain on the Metidja.

PLANORBIS.

42. *Planorbis Metidgensis*, nov. sp. Pl. XII. fig. 5.

P. testa albido-cornea, pellucida, irregulariter striata, supra profunde umbilicata, subtus plana, anfractibus tribus. Apertura rotundato-lunata, obliqua, subpatula.

Breadth $\frac{6}{10}$ inch.

Easily distinguished from *Planorbis corneus* by the very large size of the first whorl (which is wrinkled as well as striated), by the number of whorls, and by the great size of the aperture. It holds a place intermediate between *Planorbis corneus* and some American allied species, such as *Planorbis trivolvis.* I obtained this fine shell during a hurried and dangerous visit to the eastern part of the plain of Metidja, where I found it in a fountain along with *Physa contorta.*

43. *Planorbis marginatus,* Drap. (An *Planorbis marmoratus,* Michaud, Test. Alg. ?) Ditches at Boufarik.

MELANOPSIS.

44. *Melanopsis buccinoidea,* Ferr. On stones in the stream at Boufarik.

PISIDIUM.

45. *Pisidium Lumstenianum,* nov. sp. Pl. XII. fig. 4.

P. testa ovata, oblique trigona, tumida, inæquilatera, transversim striata, natibus prominentibus, roseo-corneis.

Br. $\frac{1}{3}$; length $\frac{1}{10}$ inch.

Fountains in the Metidja.

XXIX.—*On the Habits of the King of the Vultures* (Sarcorrhamphus papa). By ROBERT H. SCHOMBURGK, C.M. B.G.S., Lyceum of Natural History in New York, Honorary Member of the Bristol Institution, &c.

THE most beautiful of the deformed family of the vultures is doubtless the *Sarcorrhamphus papa,* upon which in consequence the royal title has been bestowed. It is an inhabitant of South America, and appears to be abundant in Guiana, where it has come under my notice from the coast regions to the equator. I might compare it in size, without going to actual admeasurement, to a full-grown turkey cock. Its bill is two inches in length, and its depth amounts almost to the same measure, being 1·9 inch. The upper mandible is covered by the cere, and straight in the beginning, but bent at its point to a hook; the lower mandible is straight, rounded, and scarcely inflected. The nostrils, which are within the cere, are lateral and situated close to the ridge of the upper mandibles; they open obliquely towards the point of the beak:

the cere is of a bright orange colour, and continues towards the cheeks, where it takes a blueish hue. The beak is from the margin of the cere for the extent of a few lines of a deep black colour, and from thence it is red to its point. The ridge of the upper mandible is surmounted by a fleshy caruncle of red colour, which the bird can elevate at will or allow to hang over the beak. From the base of the lower mandible arises a naked skin of orange colour, which stretches towards the lower part of the throat, surrounding likewise the fore and hinder part of the head, the cheeks and ears, appearing as a wrinkled skin which might be almost called warty, and which is covered with black hairs. These are much thicker from the regions of the eyes towards the sinciput, and continue along the cervix to the nape, where there is a raised integument; as the crown is almost bare, the head might be compared to the tonsure of a monk. The wrinkled skin possesses a blueish hue, and contrasts strongly with the bright orange of the neck. The eyes are surrounded by a red skin; the iris is of a pearly white, which is still more set off by the jet black pupil. Below the nape, the neck is encircled by a ruff of long soft feathers of a deep ash colour, which partly covers the breast, and as one half of the feathers are directed upwards and the other towards the shoulders and breast, the down of these feathers becomes visible and forms a white ring in the centre of the ruff. The interscapular regions, the scapulars, and coverts are cream colour with a roseate hue; the other wing feathers, the rump, and the tail are deep black; the breast, belly, and thighs white. The wings reach nearly to the end of the tail; the second and third quill are the longest; the tail is rounded at its extremity. The legs are robust; the tarsus reticulated, with three toes before and one behind; warty beneath; the talons bent and an inch long. The middle toe is the longest and united to the extreme one at the base.

The female is somewhat larger than the male, and of a uniform black, with the exception of the feathers under the wing, which are white. The caruncle is of less size than that of the male, and not of that intense black as the feathers; this is likewise the case with the naked skin about the neck.

In appearance the king of the vultures is one of the most

magnificent birds among the feathered tribe; however its character corresponds little with its showy vesture; it is voracious, unclean, and indolent. Their sense of smelling is uncommonly sharp, but it is only used to scent the carrion; and while the eagle devours nothing but what his talons and beak have deprived of life, and does not stoop to feed on carcasses, the odour of putrefaction possesses every allurement for the vulture; and it gorges itself to such a degree, that after a full meal it cannot rise upon its wings for a considerable time. The bird has then a most disagreeable smell, which becomes almost insupportable, if it be skinned; at other periods, and when it has been pressed hard for food, it does not emit that unpleasant odour.

The females appear to be more numerous than the males; but their number has been much exaggerated, they having been frequently confounded with the common carrion-crow (*Cathartes aura*), with whom they feed; indeed the latter may be considered their scouts; and the common report is well founded, that the carrion-crow does not touch the carcass until their majesties and spouses, of which there are frequently several present at the entertainment, have satisfied themselves to repletion: during that time they are silent and covetous spectators, and keep a proper distance, but scarcely have the others done when they fall to with voracious appetite.

Their skill in preparing skeletons is astonishing: they not only scrape off the flesh with the greatest nicety, but likewise the ligaments and periosteums, without subjecting them previously to maceration; indeed they are perfect masters in their art, and vie with the best Anatomical Instructor. When we ascended the river Berbice, a cayman was shot and dragged on shore to leave to the vultures and carrion-crows the trouble of cleaning the bones. On our return a month after, they had performed the operation to our entire satisfaction, and we concluded from the whiteness and dryness of the bones that a fortnight might have elapsed since they finished. The skeleton was subsequently unfortunately lost at the Christmas Cataracts by the upsetting of the corial*. At a later period

* A corial is a boat made solely of the trunk of a tree; they are from 20 to 40 feet long, and often 4 to 6 feet wide.

I ascertained the fact, that the carrion-crows do not touch the carcass until the vultures have satisfied themselves. I was at a Mr. Sander's at the upper river Berbice. On the opposite shore, the carcass of a cow which died the previous day had attracted a numerous assembly of carrion-crows; they were perched on the dry branches of some trees which commanded a view of the carcass; there they sat, silent and mournful, their attitude not upright but stooping; their wings partly hanging down, and their vesture being black, it appeared they had assembled to bewail the fate of the departed. There they remained the whole morning; none touched the carcass, nor did they change their position. In the afternoon our attention was attracted by the cry of the negroes, "They come, they come!" We went out, and looking towards the opposite shore, we observed four male vultures and several females flying in circles over the place where the cow was lying; the circles became narrower and narrower, and at last they lighted upon some trees in the neighbourhood; this circumstance was hailed by the sable crew, they extended their wings and became unruly, but the former silence was soon restored. The vultures did not immediately attack the dead animal; they withdrew their neck in the ruff, and remained ogling it for some time. "Tem be the judshes, and tem sit in court now to hold judshement o'er em," observed the negroes who were standing around us; and the remark was so adapted and striking, that we could not help smiling at it. After half an hour had elapsed, one of the male vultures commenced the entertainment, and his example was soon followed by the others. Towards evening the former had satisfied their appetite, and the carrion-crows commenced their feast, where harmony however did not appear to be presiding, and scuffles and quarrels took place when it concerned a favourite morsel.

They soar uncommonly high and possess great powers of flight. Like the eagle, they hover over one and the same spot for a length of time, poise their wings, and please themselves in aerial evolutions, until their sharp scent and sight combine to show them the direction where their appetite may be satisfied, when they descend in gyratory motions. They do not decline animal food of any description, provided it does not

possess life, as they are not known to kill. It is a cowardly bird, and does not oppose in single combat an animal from which it expects resistance. They rise with heavy wings and with great noise. I have not been able to ascertain where they build their nests, very likely in the most retired places. The carrion-crow (*Cathartes aura*) constructs it near the coast in the sugar fields on the ground. The young males of the king of the vultures are in their first year black; they become black and white-spotted during the second, and are only in full plumage during the third year.

While we camped in Curassawaka, a Carib settlement at the river Rupunoony, the Indians brought us three males and a female alive. One of the former had been caught in a snare; the others had been shot with the Sarbacan or blowpipe, the arrow poisoned with diluted ourari, so that it only stupified without killing. One of them died, and the other managed to get away; however one of the males and the female we had for several weeks. The female became much sooner reconciled to her fate than the male, and allowed herself to be approached; but unfortunately she got loose, and as we did not wish to give her up on easy terms, a Maconsi Indian was desired to shoot her with a poisoned arrow; the poison was not diluted, and she fell a few minutes after from the tree, and all our endeavours to save her by giving her sugar and water, which the Indians say is an antidote, proved in vain. A fine and full-grown male bird was therefore only left of the four. He was indolent while with us, and at the last moment, when he was sent to Demerara, he was not tamer than when we received him. When we approached, or a dog came near him, he would fly up or stretch his neck forth, and attempt to pick with the beak, making at the same time a noise like a goose when irritated or when defending its young. He was generally fed upon fish, and never declined when well to eat them fresh; for that purpose he kept his food with his talons and spread his wings, picking the flesh from the bones, if the fish was large, but swallowed it entire if of a small size. In his voracity he frequently miscalculated the size of his gullet, and the fish remained often for some time in it before it was entirely

swallowed. He was not partial to entrails, and when they were thrown before him, he would put his feet upon them and relax immediately to his former stooping position. Before he commenced attacking his food, he would turn his head and look at it in a squinting way. His eyes were beautiful; indeed I do not know an animal which could vie with those of the king of the vultures; the purest pearl is not whiter than his iris. During rainy weather, and during a few days when he was sick, he withdrew his neck completely in the ruff; it even covered partly the head, leaving only the forehead and the beak out. He could not endure the full heat of the sun; he panted and showed every sign of being uncomfortable.

They are easily tamed if taken young. Mr. Glen in Demerara had a female bird which was so tame that it would lay itself before its master's feet; and its power of recognition was so great, that if it happened to be on the roof of the highest house when Mr. Glen walked by in the street, it would descend rapidly as an arrow, and lie down before his feet, as it had been accustomed to do. I saw a full-grown male bird which was brought from Surinam to Demerara; it was perfectly tame, and was ultimately sold to the master of an English merchantman for the enormous price of twenty pounds sterling.

The Indians when we travelled with them never failed to attract our attention to this bird when they discovered one soaring in the air. The Maconsis call it Cassana, the Wapeshanas Panaourou, the Warrows Wouraerepo.

XXX.—*On the British Species of* Lotus. *By* Charles C. Babington, M.A., F.L.S., F.G.S., &c.

The British species of *Lotus* have now been the subject of controversy for many years, some most eminent botanists considering all our plants to be referable to only two (*corniculatus* and *angustissimus*), others supposing that they constitute four, if not five distinct species; but after a careful examination of numerous individuals, in their native localities, I have come to the conclusion that we possess four quite distinct

specific forms, namely, *L. corniculatus, major, angustissimus,* and *hispidus*. *L. tenuis* of 'Eng. Bot. Suppl.' (*L. decumbens,* Forst.) I am induced to refer as a variety to *L. corniculatus,* not having been able to discover any permanent characters, by which it may be distinguished from that plant. The form and structure of the pod appear to be amongst the most valuable characters in this genus, and the direction of the calycine segments, more particularly in the two first species, is deserving of great attention. The form of the leaves and the quantity of pubescence can only be considered as distinguishing varieties.

The specific characters which I have given may appear longer than is desirable, but I have found it impossible to condense them into a shorter form without omitting some characteristic points of the respective species. I have thought it unnecessary to load this paper with synonyms, since I do not believe that there is any confusion in that part of the subject.

LOTUS, *Linn.*

1. *L. corniculatus,* Linn. (Sp. Pl. 1092.) Vexilli ungue obovato transversim camerato, calycis apicibus ante anthesin conniventibus, laciniis e basi triangulari subulatis tubum suum subæquantibus et corolla multo brevioribus 2 superioribus apicibus convergentibus, leguminibus ex apice medio rostratis, capitulis 5—10-floris.

α. *vulgaris* (Koch.) glabriusculus vel sparse pilosus, caulibus ascendentibus, foliolis obovatis, stipulis ovatis inæqualibus. *Eng. Bot.* t. 2090.

β. *villosus* (Ser.) caulibus foliisque villosis. *L. villosus,* Thuill.

γ. *crassifolius* (Pers.) pilosus, caulibus humilibus stoloniferis, foliolis obovatis crassis, stipulis ovatis inæqualibus.

δ. *tenuis,* glaber vel sparse pilosus, caulibus filiformibus elongatis procumbentibus ascendentibusve, foliolis linearibus vel lineari-obovatis, stipulis semi-ovatis (calycis laciniis brevibus). *Eng. Bot.* t. 2615.

Root strong, slightly woody, perennial, in loose sandy soil, stoloniferous. Stems spreading, procumbent or ascending, hairy or glabrous, varying much in length, solid. Leaflets obovate, in δ linear or linear-obovate, glabrous or slightly hairy,

in β clothed with long spreading hairs, strongly ciliated and fleshy in γ. Stipules ovate, slightly unequal, in δ semi-ovate. Peduncles long. Bracteas obovate, slightly unequal. Pedicels very short, 5—10 together. Calyx segments about as long as their own tube, shorter in γ, equalling or slightly shorter than that of the corolla, their tips not diverging in the bud, the points of the two upper ones turned towards each other when the flower has expanded, the interstices between the segments rounded. Flowers yellow, claw of the standard much dilated and vaulted transversely. Pods linear, terete, straight, with a long setaceous deflexed rostrum springing exactly from the middle of the apex. Seeds numerous, oval, compressed, smooth.

Common throughout the British Islands, in fields, on hedge banks, and dry places.

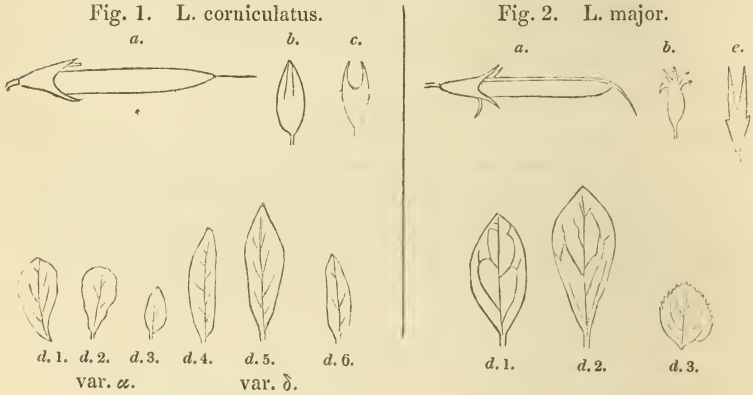


Fig. 1. *a.* Legume. *b.* Unopened bud, to show the direction of the tips of the calyx. *c.* The two upper segments of the calyx, to show the rounded space between them and their converging tips. *d.* 1. A lateral leaflet of var. α. *d.* 2. The central leaflet of var. α. *d.* 3. A stipule of var. α. *d.* 4., *d.* 5., *d.* 6. The same parts respectively of var. δ.

Fig. 2. The letters represent the corresponding parts, and all the drawings are about the natural size.

My friend Mr. Borrer, who has had frequent opportunities of studying *L. tenuis* in a living state, continues fully convinced that it is a truly distinct species, founding its characters upon the much shorter segments of the calyx and the elongated procumbent habit of the plant. I am sorry to be obliged to

differ from so excellent a botanist, but am of opinion that those are not sufficient differences upon which to found a species in this genus. The plant is more slender in all its parts, but I have not been able to detect any differences in structure except those mentioned in the description.

2. *L. major*, Scop. (*Carn.* 2. 86.) Vexilli ungue lineari, calycis apicibus ante anthesin in stella dispositis, laciniis e basi triangulari subulatis tubum suum subæquantibus et corolla multo brevioribus 2 superioribus divergentibus, leguminibus e sutura superiori rostratis, capitulis 8—12-floris, foliolis obovatis, stipulis ovato-rotundatis inæqualibus.

α. *vulgaris*, pilosus, caulibus erectiusculis. *Eng. Bot.* t. 2091.

β. *glabriusculus*, glaber, foliolorum stipularum bractearum sepalorumque marginibus et nervis exceptis quæ longè ciliatæ sunt, caulibus erectis vel procumbentibus.

Root strong, perennial. Stems erect or ascending 1—3 feet high, clothed with long spreading hairs, in β glabrous, hollow. Leaflets obovate, obtuse, or pointed, covered both above and below with long scattered hairs, in β the hairs are confined to the margins and nerves. Stipules orbicular or short ovate, very minutely serrated, hairy like the leaves. Peduncles very long. Bractea ovate, the lateral one slightly unequal. Pedicels very short, 8—12 together. Calyx segments about as long as their own tube, longer than that of the corolla, acute, their tips spreading like a star before the expansion of the bud, the tips of the two upper ones never converging, their interstice forming an acute angle. Flowers yellow, claw of the standard linear and longitudinally vaulted. Pods linear, terete, straight, having a long setaceous straight rostrum springing from the upper suture. Seeds numerous, minute.

Frequent in damper places than the last, but sometimes found in very dry places.

The Rev. Dr. Beche, late Dean of Bristol, was I believe the first botanist who noticed the valuable character drawn from the stellate tips of the calyx, by which this species may at all times be distinguished from *L. corniculatus*. From laying too much stress upon the presence or absence of hairs as a specific distinction between these plants, several botanists

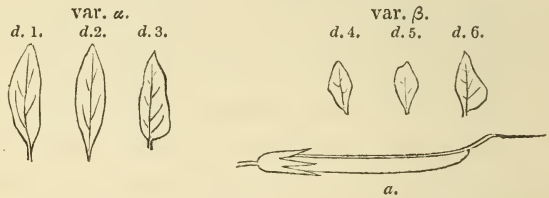
have been induced to consider the characters given above as variable, but there is nothing more uncertain in this genus than the quantity of the pubescence, unless it is the direction of the stems. The same species may be found glabrous, hairy, or even woolly, and its stems procumbent or erect. I need scarcely add, that the field is the right place for examining these plants, many of their most permanent differences vanishing when the plant has been pressed and dried for the Herbarium.

3. *L. angustissimus,* Linn. (Sp. Pl. 1090.) Vexilli ungue lineari calycibus ante anthesin rectis, laciniis subulatis tubum suum subæquantibus petalis brevioribus, leguminibus e sutura superiore recte rostratis calyce sextuplo longioribus linearibus.

α. *Linnæanus.* Pedunculo florigero folium subæquante, fructifero duplo longiori, foliolis stipulisque ovato-lanceolatis acutis, caulibus procumbentibus.—L. angustissimus, *Linn. Herb.* L. diffusus, *Ser. in DC. Prod.* 2. 213. L. angustissimus β diffusus, *Bot. Gall.* 1. 138.

β. *Seringianus.* Pedunculo semper folium subæquante, foliolis obovato-oblongis stipulisque ovatis acutis, caulibus ascendentibus. —L. angustissimus, *Ser. in DC. Prod.* 2. 213. *Bot. Gall.* 1. 137.

Fig. 3. L. angustissimus.



Root strong, annual. Stems procumbent or ascending, numerous, branched, filiform, covered with long hairs. Leaflets ovate-lanceolate in var. α, obovate oblong in β, pointed. Stipules oblique ovate-lanceolate and acute in α, ovate, slightly attenuated, and less acute in β. Peduncles about as long as the leaves, in α much lengthened when bearing fruit. Bracteas lanceolate, usually 3, equalling or shorter than the calyx. Pedicels very short, usually solitary. Calyx segments about as long as their tube, but shorter than the corolla. Flowers yellow, small. Pods five or six times as long as the calyx,

slender, slightly uneven, subterete, glabrous, having a long setaceous straight rostrum springing from the superior suture. Seeds minute, orbicular, compressed, pale.

Hab. var. *α*. Cornwall, *Dr. Jacob*. Lanes in Jersey. South coast of Alderney, Jethon and Guernsey. Banks of the Volga. *Ch. de Steven in Sm. Herb.* Var. *β*. Near Hastings, *Mr. Dickson*. Devonshire, *Dr. Beche*. In Jersey.

4. *L. hispidus*, Desf. (*Cat. Jar. Par.* 190.) Vexilli ungue subulato, calycibus ante anthesin rectis, laciniis subulatis tubo suo longioribus petalis brevioribus, leguminibus calyce duplo longioribus rugosis teretibus cum rostro elongato setaceo defracto in apice medio locato, pedunculo folio semper longiore, foliolis obovato-lanceolatis, stipulis semicordatis, caulibus procumbentibus. *DC. Prod.* ii. 212. *Bot. Gall.* 137. *Lois. Fl. Gall.* t. 16.

Fig. 4. L. hispidus.

Root strong, fibrous, annual. Stems procumbent, numerous, nearly simple, filiform, covered, as well as the leaves and calyx, with long hairs. Leaflets obovate, with a minute point. Stipules oblique, semicordate. Bracteas ovate, often solitary, about as long as the calyx. Peduncles always longer than the leaves. Pedicels very short, solitary, or 2—3 in each head. Calyx segments longer than their tube, but shorter than the corolla. Flowers, yellow, small. Pods about twice as long as the calyx, thick, slightly uneven, terete, glabrous, having a long setaceous rostrum which springs from exactly the middle of the point and is immediately bent down at a right angle. Seeds minute, orbicular, compressed, pale, often with numerous very small dark spots.

Hab. Near Penzance, Cornwall, *Mr. H. C. Watson*. Dartmouth, *Mr. Woods*. Guernsey and Alderney, very common.

The much shorter pod of this species is the most convenient distinguishing mark between it and *L. angustissimus*; its habit also is different, and both of them differ remarkably in appearance from the two first species. The great rarity of these

plants in England has no doubt caused them to be misunderstood by most of our native botanists, and I feel great pleasure in being able to give the result of my study of the living plants in the Channel Islands, where they occur in profusion. It appears to me that no two plants can be more truly distinct than this species and its predecessor.

St. John's College, Cambridge, Oct. 27, 1838.

XXXI.—*On Fishes; containing a notice of one Species new to the British, and of others to the Irish Fauna.* By William Thompson, Esq., Vice-President of the Natural History Society of Belfast.

Coregonus clupeoides, Nillson.? Cunn.—In a letter from the Rev. T. Knox, of Toomavara, dated Jan. 29, 1838, and accompanying a specimen of a fish procured at my request, was the following observation: "We have at last been able to get the little fish mentioned by the fishermen as being found in the Shannon in winter—it was sent from Killaloe. I believe it goes down the river with the eels every winter; it takes no bait." The Rev. C. Mayne of Killaloe—by whose kind attention the specimen was secured—informs me, in reply to some queries, "that it is called a *Cunn* by the fishermen of that place, who state that it is never taken but in the eel-nets about Christmas, when the 'run of eels' is nearly over, and that they never saw more than seven or eight caught in a year, seldom indeed so many." Killaloe, it should perhaps be stated, is not less than eighty miles from the mouth of the Shannon. In the hope of ascertaining the occurrence of this fish at Portumna, about twenty miles higher up the river, I wrote to a correspondent there, at the same time describing the species, and on the 24th of March last received the following reply. "I think it very uncertain whether there is such a fish in the Shannon, but still some old fishermen say there is, and that they are a little smaller than the common herring, but exactly the same shape and colour;" and he again observes—"after making every inquiry, I learn that about half a dozen *white fish* like herrings were got in Lough Derg [a mere expansion of the river Shannon] very near this, about

four years ago in the eel-nets, but none since, at least in this quarter." So far only is the history of the species known to me: that the *white* fish were this *Coregonus*, I think hardly admits of doubt.

On examining the specimen, the nearest approximation I find to it is the *Salmo clupeoides* of Pallas*, and *Cor. clupeoides* of Nillson†, who with a query marked Pallas's as synonymous with his species.

Although there is a tolerable general agreement, yet a want of accordance in some characters between my specimen and the description in the 'Zoographia' renders it doubtful whether they be the same fish. Between it and Nillson's *C. clupeoides* I perceive no specific (though a considerable individual) difference, and consider them identical, if the phrase "tereti-compresso," applied to the body in his specific characters, be taken singly, and be translated, roundly compressed; but if "tenue‡," applied again to the body in the detailed description, mean that it is thin or compressed, the species cannot be the same, the individual under consideration being very thick for one of the *Coregoni*.

Nillson is altogether silent on the history of this species, stating merely that it was sent him with other fishes from lake Wettern. As this lake communicates with the Baltic, it is to be regretted that we are not informed whether the *Coregonus* be stationary in it, or migrate to the sea as the Shannon species is believed to do.

Desc.—General form, gracefully elongated, sloping equally from the centre of back to the head and tail, the anterior and posterior portions of the ventral profile also corresponding to each other, but rather more convex than the dorsal; rounded in the back (like *Atherina Presbyter*); considerable thickness maintained throughout§. Length $4\frac{1}{4}$ inches; depth where

* Zoographia Russo-Asiatica, iii. pp. 410, 411. To this work I have not had access, but am indebted to my friend Mr. Ogilby for transcribing from it the full description, and sending it me from London.

† Prodromus Ichthyologiæ Scandinavicæ, p. 18.

‡ The commencement of the specific characters is "C. corpore elongato, tereti-compresso;" the detailed description "Corpus elongatum, tenue."

§ It is so formed, especially the anterior half, that like the *Coregonus quadrilateralis* of the 'Fauna Boreali-Americana,' (pl. 89. fig. 1.) it might be called "four-sided with the angles rounded off."

greatest, at origin of dorsal fin, 9 lines, or compared with the entire length as 1 to $5\frac{1}{2}$; thickness more than half the depth, just behind the head 5 lines, the same at the middle, and $\frac{1}{4}$ of an inch before the base of the caudal fin 2 lines; lateral line for $\frac{1}{4}$ of an inch from its origin sloping downwards, thence to its termination straight, and except at the tail, where it is equidistant from each, placed rather nearer the dorsal than the ventral profile; head 11 lines long, or about as 1 to $3\frac{1}{2}$ in the entire length; eye large, placed at the distance of its own diameter from the snout, and occupying $\frac{1}{4}$ the length of head; upper jaw truncated, lower roundish-oval, and when the mouth is closed projecting $\frac{1}{2}$ a line beyond the snout, (in this respect exceeding that of the vendace, *Cor. Willoughbigii*, Jard.) The only teeth apparent with the aid of a lens are a few placed regularly on both upper and under jaws, none apparent on the tongue or the vomer; pre-opercle nearly describing the segment of a circle, opercle from the posterior base gradually narrowing upwards. *Fins*; dorsal originating half-way between extremity of lower jaw and base of caudal; pectorals pointed, nearly $\frac{3}{4}$ the length of head, these and the ventrals of about equal length; the latter commencing in a line with the first quarter of dorsal; when laid close to the body, the dorsal approaches the tail more nearly than the ventral; anal distant its own length from the first short ray of caudal; adipose ending nearly on the same line as the anal.

D. 15 (1st very short); P. 15*; V. 1+11; A. 16 or 17; C. $20\frac{1}{12}\frac{2}{}$=Br. 7.

Scales (judging merely from their impressions, they having been rubbed off) about 85 on the lateral line, 10? from it to the origin of the dorsal fin; and 12? from it to the ventral profile: the scales not being always precisely defined, the numbers cannot be accurately determined.

Colour (in spirits), bluish black along the back, thence olive to the lateral line, where it becomes somewhat silvery, and beneath it of a bright silver to near the base, where a gloss appears as if when recent it had been tinged with pink; belly opake white, slightly tinged with silver anteriorly, oper-

* This number appears in both fins, which are somewhat injured.

cula bright silver, irides silvery, bounded by a blackish line above and beneath.

Although the expression of "common" be at variance with what I could learn of the history of this species, it is probably in allusion to it that Sir Wm. Jardine remarked in a letter to me in November 1836, that he had heard of a fish called the "freshwater herring" being common in Lough Derg.

All the *Coregoni* hitherto recorded as British are lacustrine species, thus rendering the addition to the Fauna of the present one, which frequents the river Shannon, more than ordinarily interesting. That it migrates to the sea, as do others of the genus, both in this and the western hemisphere, is by no means improbable; but as yet, instead of proof of the fact, we have simply the conjecture of fishermen, who would not be unlikely to draw such an inference from the mere circumstance of capturing it at the same time with eels, which they know to be on their migration seawards*.

Salmo ferox, Jard. and Selby.—As in the instance of the last species, I in announcing the Lake Trout to be found in Ire-

* *Coregonus Pollan*, Thomp. A few observations on the pollan, the only other species of *Coregonus* yet detected in Ireland, will not be out of place here. When my paper on this fish was published (Mag. Zool. and Bot., vol. i.) I had seen specimens only from Lough Neagh, but from Harris's History of the County of Down it was quoted, "that Lough Earn in the county of Fermanagh has the same sort of fish, though not in so great plenty [as L. Neagh]." This I am now enabled to verify. That the pollan is not "in so great plenty" there, I became well satisfied during a visit—which was indeed a very hurried one—to the lake in the autumn of 1837, when by inquiry from many persons I could not learn anything of such a fish. But by the kind attention of Viscount Cole, who resides within a few miles of Lough Erne, I have been lately favoured with examples of the *C. Pollan* from that locality. On the 22nd of October last, I received a specimen which was taken two days before, and was stated to have been the first caught this season. On the 29th of the same month, I was obligingly supplied with more examples; and in a letter dated from Florence Court the preceding day, Lord Cole remarked, in reference to the species, "I have now procured in all about ten or twelve. I cannot make out that they are ever caught in any numbers in Lough Earn; indeed they are never sought after—those which I have got were taken in eel-nets in the upper lough. I have heard that three or four were caught in the lower lough this year in a drag-net. This is all I at present know about them."

Since my account of the pollan appeared, I have been favoured by Dr. Parnell with a specimen of the *Coregonus* of Loch Lomond (see his paper on this subject in the Annals of Natural History, vol. i. p. 161.) and by Sir Wm. Jardine with one of the Ullswater species; both of which are distinct from the *Cor. Pollan*, this having not as yet been found in any of the lakes of Great Britain.

land (see Proceedings of the Zoological Society of London, 1835, p. 81) could with certainty speak of it only as an inhabitant of Lough Neagh. Since that period I have ascertained that it frequents Lough Corrib, in the county of Galway; the head of a specimen there taken having been submitted to my examination by Mr. R. Ball. More recently, Lord Cole has kindly transmitted me a fine example, of about 11 lbs. weight, from Lough Erne, thus proving it to be an inhabitant of the three largest lakes in Ireland. From all that I have heard and read, I doubt not that it is found in several other of our lakes, perhaps in all of considerable extent throughout the country.

Anguilla latirostris, Yarr.—In my last paper on fishes (see Annals, p. 21 of the present volume) this species is stated to be called "Culloch,"—by my having adapted the orthography to the sound of the word,—at Lough Neagh. It should rather have been *collach,* as by reference to O'Reilly's Irish Dictionary, I have since ascertained this word to imply "wicked," and hence doubtless the origin of the name, the species being characterized as most voracious and as subsisting chiefly on other fish. The person who described it to me by the name of *collach* gave a direful account of this propensity, by stating that "it *drinks* the young fry in." The provincial names of Gorb and Glut Eel have obviously been bestowed upon it for a similar reason.

Fishes new to Ireland.

Exocœtus ———? Flying-fish.—I am informed by Mr. Ball, that according to the testimony of several intelligent fishermen at Youghal, flying fishes have in different years been seen by them in summer near the southern coast of Ireland:—the accurate manner in which they describe the "flight," &c. leaves no doubt on my mind that the fishes alluded to must have been some species of *Exocœtus.*

Raniceps trifurcatus, Flem. Tadpole Fish.—To Capt. Fayrer, R.N. I am indebted for a specimen of this fish, picked up on the 21st September 1837, as it lay floating upon the sea off Donaghadee harbour—it was received in a recent state. Its agreement with Dr. Johnston's description (Yarrell's Brit.

Fish. vol. ii. p. 206.) is so complete, that any except the few following notes on the individual seem to be unnecessary.

Its length is $10\frac{1}{2}$ inches; in number the fin rays are

D. 3—63; A. (somewhat injured) 57? P. 23; V. 6; C. 36.

Second ray of the first dorsal fin thrice the length of the other rays; second ray of the ventral fins considerably the longest; no tubercles on sides sensible either to sight or touch; no lateral line apparent; body all over "smooth and even;" cirrus $4\frac{1}{2}$ lines long.

In *colour* it is entirely of a lilac brown except the belly, which is dirty white very faintly tinged with lilac; folding of the lips china-white; fins all of an uniform lilac black, except the ventrals, of which a portion is paler than the rest; inside of mouth pure white; irides of a yellowish-brown colour.

Pleuronectes punctatus, Bloch. Bloch's Top-knot. —One of these very rare fishes, of which two British specimens only are on record (the first obtained at Zetland and the other at Weymouth), was taken on the 16th of June last, by Dr. J. L. Drummond, when dredging within the entrance of Belfast bay. Together with the other fishes at the same time captured, comprising specimens of *Solea Lingula* and *S. variegata*, it was with kind consideration promptly sent to me.

The following notes were made from the recent specimen: length $4\frac{3}{4}$ inches; number of fin-rays

D. 72 and 3; A. 56 and 5; P. 10*; V. 6; C. 16 in all.

Compared with a specimen of *P. hirtus*, Mull. ($6\frac{1}{2}$ inches in length, and likewise taken on the coast of Down†), the ridge between the eyes is much more elevated, the difference being strikingly conspicuous when the two species are placed

* The dorsal fin, strictly considered, has but seventy-two rays, and the finlet connected with it extending under the tail three rays; of these the two first divide near the base, and each division becomes forked; the third ray divides into three near the base, each division likewise becoming forked. The anal fin has, independently of a similar finlet, fifty-six rays; finlet with five rays, the three last dividing each into two near the base, which divisions again, as in the opposite one, become forked. This explanation will perhaps account for the less number of D. and A. fin-rays set down to the present specimen than is generally attributed to the species. The divisions here mentioned have probably been reckoned as distinct rays. Pectoral fin larger on the upper than on the under side; ten rays in each.

† See Proceedings Zool. Soc., 1837, p. 60.

together; lateral line on both sides much arched within the range of the pectoral fins, thence straight to the tail.

The upper side presents as a ground colour a mixture of various shades of light brown, with a round dark spot, 3 lines in diameter, commencing an inch from the tail; it is likewise marked with a very few smaller inconspicuous round dark-coloured spots, and blotched irregularly with very dark rich brown. The fins do not exhibit any round spots as shown in Dr. Fleming's figure (Phil. of Zool., vol. i. pl. 3), but are all irregularly marked on the upper side with many different shades of brown; irides reddish-golden; under side of body white, with a very pale reddish tinge. In all characters not mentioned here this specimen accords with Mr. Jenyns's description (p. 462).

With Mr. Yarrell I agree in considering the *Rhombus unimaculatus* of Risso (Hist. Nat. l'Eur. Mer. t. iii. p. 252, f. 35) identical with this species. In the number of rays in the fins, individuals appear to differ considerably, but perhaps not more so than might be expected when so great is their number.

Mustelus lævis and *Hinnulus.*—I embrace this opportunity of offering a few remarks on the identity of the *Squalus Mustelus*, Linn. (*Mustelus lævis*, Will.), and *Sq. Hinnulus*, Blain.* (*Must. stellatus*, Risso). As some authors are agreed on this subject, it may perhaps be considered unnecessary to treat further of it, but I do so in reference to the place *S. Hinnulus* occupies in Mr. Jenyns's excellent 'Manual', p. 503. Here a short description is given of a fish taken at Weymouth, of which it is said that it "appears to be identical with the *S. Hinnulus* of Blainville;" afterwards the remark is made, "that it is a great question whether this last be anything more than a variety of *S. Mustelus.*"

The following observations are on a specimen taken in Belfast bay on the 16th of July last, and received by me before life was extinct. This individual combined in colour Mr. Jenyns's descriptions of *S. lævis* and *S. Hinnulus*, having, as the former is described, the "upper parts of a uniform pearl gray," and being "paler or almost white beneath;" at the same time

* Faune Française, p. 83, pl. 20, f. 2.

presenting with the *S. Hinnulus* * "a row of small whitish spots from the eye towards the first of the branchial openings; lateral line *indistinctly*? spotted with white; also a moderate number of small scattered white spots between the lateral line and the dorsal ridge." The lateral line is in my specimen closely spotted with white, of a silvery lustre, from its origin to the extremity of the second dorsal fin, where this marking terminates; but a row of similar spots appears throughout the entire tail, beginning at the origin of the caudal fin on the upper side, and placed between its margin and the lateral line; "a moderate number" of white spots, as described above this line, as far as the extremity of the second dorsal fin; these are larger than those on the line and have the same silvery lustre; the short space intervening between the end of the second dorsal and the origin of the caudal fin is spotless. No spots on the body below the lateral line, nor on any of the fins, which are pearl grey; the pectorals varied with a whitish tinge along the margin, and the first dorsal with a dusky tip. Pupil of the eye black; irides silvery, with iridescent hues; eye 10 lines in length†, oblong-oval in form. This individual agrees in every character with the *M. stellatus* as described by Risso‡, 'Hist. Nat. l' Eur. Merid.', t. iii. p. 126. Mr. Yarrell's figure of *M. lævis* (vol. ii. p. 393) is a very good representation of this fish. The present individual differs from it in having a close row of spots along the lateral line, and both lobes at the base of the caudal fin conspicuously displayed, the anterior one nearly as much so as in the preceding figure of *Galeus vulgaris* in the same work.

The specimen under description is a female. The stomach was filled with brachyurous crustacea, including a perfect and full-grown *Corystes Cassivelaunus.*

Other specimens of *Mustelus lævis* that I have examined, and which were about the same size as the one described, were similar in the characters above given; this is mentioned as showing that the white spots above the lateral line are not peculiar to the young fish. See Yarrell, B. F., vol. ii. p. 394.

* "Brownish-ash" is given as the general colour by Mr. Jenyns; Risso describes the *M. stellatus* to be "d'un gris de perle en dessus."

† The *Squalus Canicula* is so different in this respect, as from the smallness of its eyes to be commonly called *blind dog-fish* in the north of Ireland.

‡ The figure of *S. Hinnulus* in the 'Faune Française' shows the identity.

XXXII.—*On the Wild Cattle of Chillingham Park.* By L. Hindmarsh, Esq., of Alnwick *.

The history of every country is one of change. This applies not only to man and his social relations, but to everything animate and inanimate. In some localities the sea has become dry land; in others, the soil which once flourished with vegetation has become the bed of the ocean. Sterile wastes have been transmuted into fertile plains, and dense forests into cultivated fields; and many of those animals which once roamed through them in ferocious independence are swept away, and are only found in those historic records which nature has preserved in her great museum of fossil remains. The rapid progress of population and culture has accelerated the depopulation of wild animals, and within a period not very remote, has rid this country of many of its ferocious inhabitants. Bears, which formerly infested this island, were extirpated at a comparatively early period; yet there is evidence of their existence in Scotland so late as the year 1057, when a Gordon, in reward for his prowess in killing one, was directed by the king to carry three bears' heads upon his banner. After them the wild boar and wolf were finally exterminated. Of the latter, one was however destroyed in Scotland so late as 1680, and in Ireland some were found even so far down as 1710. Of the wild ox it is probable that one remnant at least survives in the wild cattle of Chillingham Park, Northumberland, the property of the Earl of Tankerville. Their origin, character, and habits form the subject of the present inquiry.

In promotion of this object we have been most obligingly favoured by their present noble and accomplished proprietor with the following very interesting account of them, which needs no further preface to its introduction in this place. The following is an exact copy.

"Grosvenor Square, June 8, 1838.

"Sir,

"Some time since I promised to put down upon paper whatever I knew as to the origin, or thought most deserving of notice in respect to the habits and peculiarities of the wild cattle at Chillingham. I now proceed to redeem my promise, begging your pardon for the delay.

* Read before the late Meeting of the British Association at Newcastle, and communicated by the Author.

"In the first place I must premise that our information as to their origin is very scanty. All that we know or believe in respect to it rests in great measure on conjecture, supported, however, by certain facts and reasonings which lead us to believe in their ancient origin, not so much from any direct evidence, as from the improbability of any hypothesis ascribing to them a more recent date. I remember an old gardener of the name of Moscrop, who died many years ago, at the age of perhaps 80 or more, who used to tell of what his father had told him as happening to him when a boy, relative to these wild cattle, which were then spoken of as wild cattle, and with the same sort of curiosity as exists with respect to them at the present day.

"In my father and grandfather's time we know that the same obscurity as to their origin prevailed; and if we suppose (as no doubt was the case) that there were old persons in their time capable of carrying back their recollections to the generation still antecedent to them, this enables us at once to look back to a pretty considerable period, during which no greater knowledge existed as to their origin than at the present time. It is fair, however, to say, that I know of no document in which they are mentioned at any early period. Any reasoning, however, that might be built on their not being so noticed would equally apply to the want of evidence of that which would be more easily remembered or recollected,—the fact of their recent introduction.

"The probability is that they were the ancient breed of the island, inclosed long since within the boundary of the park.

"Sir Walter Scott, rather poetically, supposes that they are the descendants of those which inhabited the great Caledonian forest extending from the Tweed to Glasgow, at the two extremities of which, namely at Chillingham and Hamilton, they are found. His lines in the ballad 'Cadyon Castle,' describe them pretty accurately at the present day:

'Mightiest of all the beasts of chase,
That roam in woody Caledon,
Crushing the forest in his race,
The mountain bull comes thundering on.

'Fierce on the hunter's quiver'd band
He rolls his eye of swarthy glow,
Spurns with black hoof and horns the sand,
And tosses high his mane of snow.'

I must observe, however, that those of Hamilton, if ever they were of the same breed, have much degenerated.

"The park of Chillingham is a very ancient one. By a copy of

the endowment of the vicarage extracted from the records at Durham, and referring to a period certainly as early as the reign of King John, about which time, viz. 1220 or thereabouts, the church of Chillingham was built, the vicar of Chillingham was, by an agreement with Robert De Muschamp, to be allowed as much timber as he wanted for repairs, of the best oak, out of the Great Wood (Magno Bosco) of Chillingham, the remains of which were extant in the time of my grandfather. The more ancient part of the castle also appears to have been built in the next reign, that of Henry III., since which it has been held without interruption by the family of Grey. At what period or by what process the park became inclosed, it is impossible to say; but as it was closely bounded by the domains of the Percies on the one side and by the Hibburnes on the other (the latter of whom had been seated there since the time of King John); and as the chief branch of the Greys always made Chillingham their principal residence until it passed into the hands of Lord Ossulston, by his marriage with the daughter and heiress of Ford Lord Grey, it is reasonable to suppose, that in order to secure their cattle, wild and tame, they had recourse to an inclosure, probably at an early period.

"It is said that there are some other places in which a similar breed is found,—Lynn Park, in Cheshire; Hamilton (as I before mentioned); and Chartley Park (Lord Ferrers).

"The first I have not seen, but they are described as of a different colour, and different in every respect. Those at Hamilton, or rather Chatelherault, I have seen, and they in no degree resemble those at Chillingham. They have no beauty, no marks of high breeding, no wild habits, being kept, when I saw them, in a sort of paddock; and I could hear no history or tradition about them which entitled them to be called wild cattle. Those at Chartley park, on the contrary, closely resemble ours in every particular, in their colour,—with some small difference in the colour of their ears,—their size, general appearance, and, as well as I could collect, in their habits. This was a very ancient park, belonging formerly to Devereux Earl of Essex, who built the bridge over the Trent, to communicate with his chace at Cannock and Beaudesert, then belonging to him; and the belief is, that these cattle had been there from time immemorial.

"With respect to their habits, it is probable that you will learn more from Cole, who has been park-keeper at Chillingham for many years, than from any information that I can give. I can mention, however, some particulars. They have, in the first place, pre-eminently all the characteristics of wild animals, with some peculiarities

that are sometimes very curious and amusing. They hide their young, feed in the night, basking or sleeping during the day; they are fierce when pressed, but, generally speaking, very timorous, moving off on the appearance of any one, even at a great distance. Yet this varies very much in different seasons of the year, and according to the manner in which they are approached. In summer I have been for several weeks at a time without getting a sight of them, they, on the slightest appearance of any one, retiring into a wood, which serves them as a sanctuary. On the other hand, in winter, when coming down for food into the inner park, and being in constant contact with people, they will let you almost come among them, particularly if on horseback. But then they have also a thousand peculiarities. They will be feeding sometimes quietly, when if any one appears suddenly near them, particularly coming down the wind, they will be struck with a sudden panic and gallop off, running one over the other, and never stopping till they get into their sanctuary. It is observable of them, as of red deer, that they have a peculiar faculty of taking advantage of the irregularities of the ground, so that on being disturbed, they may traverse the whole park and yet you hardly get a sight of them. Their usual mode of retreat is, to get up slowly, set off in a walk, then a trot, and seldom begin to gallop till they have put the ground between you and them in the manner that I have described.

"In form they are beautifully shaped, short legs, straight back, horns of a very fine texture, thin skin, so that some of the bulls appear of a cream-colour, and they have a peculiar cry, more like that of a wild beast than that of ordinary cattle. With all the marks of high breeding, they have also some of its defects: they are bad breeders, and are much subject to the rash, a complaint common to animals bred in and in, which is unquestionably the case with these as long as we have any record of them.

"When they come down into the lower part of the park, which they do at stated hours, they move like a regiment of cavalry, in single files, the bulls leading the van, as, in retreat, it is the bulls that bring up the rear.

"Lord Ossulston was witness to a curious way in which they took possession as it were of some new pasture recently laid open to them. It was in the evening about sunset. They began by lining the front of a small wood, which seemed quite alive with them, when all of a sudden they made a dash forward altogether in a line, and charging close by him across the plain, they then spread out, and after a little time began feeding.

"Of their tenacity of life the following is an instance:—

"An old bull being to be killed, one of the keepers had proceeded to separate him from the rest of the herd, which were feeding in the outer park. This the bull resenting, and having been frustrated in several attempts to join them by the keeper interposing (the latter doing it incautiously), the bull made a rush at him and got him down; he then tossed him three several times, and afterwards knelt down upon him and broke in several of his ribs. There being no other person present but a boy, the only assistance that could be given him was by letting loose a deer-hound, belonging to Lord Ossulston, who immediately attacked the bull, and, by biting his heels, drew him off the man, and eventually saved his life. The bull, however, never left the keeper, but kept continually watching and returning to him, giving him a toss from time to time. In this state of things, and while the dog, with singular sagacity and courage, was holding the bull at bay, a messenger came up to the castle, when all the gentlemen came out with their rifles and commenced a fire upon the bull, principally by a steady good marksman from behind a fence, at the distance of 25 yards; but it was not till six or seven balls had actually entered the head of the animal (one of them passing in at the eye) that he at last fell. During the whole time he never flinched nor changed his ground, merely shaking his head as he received the several shots.

"Many more stories might be told of hair-breadth escapes, accidents of sundry kinds, and an endless variety of peculiar habits observable in these animals, as more or less in all animals existing in a wild state; but I think I have recapitulated nearly all that my memory suggests to me as most deserving of notice, and will only add that if you continue in the intention of preparing a paper to be read before the approaching scientific assemblage at Newcastle on this subject, you are welcome to append this letter to it as containing all the information which I am able to give.

"I have the pleasure, &c. &c.,

"TANKERVILLE."

"To L. Hindmarsh, Esq."

To this very interesting and graphic description little need be added, except a few particulars gathered from Mr. Cole, who has been park-keeper upwards of 30 years. At present there are about 80 in the herd, comprising 25 bulls, 40 cows, and 15 steers, of various ages; and no sight can be more beautiful than they were in the month of June last, when we saw them retreating in regular order into their forest sanctuary.

Their perfect symmetry, pure white colour, and fine crescent horns, render them, when moving in a body, a very imposing object. The eyes, eye-lashes, and tips of the horns alone are black; the muzzle is brown, the inside of the ears red or brown, and all the rest of the animal white. Even the bulls have no manes, but only a little coarse hair upon the neck; and they fight for supremacy until a few of the most powerful subdue the others, who afterwards submit to the rule of superior physical strength. If, by accident, a bull gets separated from the herd for a day or two, his settled relation seems to be forgotten; for on his rejoining it a fight ensues, and the conflict continues until the previous amicable understanding is re-established. The cows generally commence breeding at three, and continue to breed for a few years. When they calve, they hide their young for a week or ten days, and repair to the place of concealment two or three times a day for the purpose of suckling them. Should any person happen to approach their hiding-place the calves clap their heads close to the ground and lie in form like a hare. The cows suckle their calves nine months. The late Mr. Baily of Chillingham relates that he chanced to find a hidden calf two days old, very lean and weak; but on stroking its head, it got up, pawed two or three times like an old bull, and bellowing loudly, retired a few steps, and then bolted at him with all its force. The attack was repeated; but Mr. Baily, aware of its intention, moved aside, and it missed him and fell with such force as to prevent its rising. Its cries had however alarmed the whole herd, which came to its rescue, and forced him to retreat. This fact affords a strong indication of the wildness of this breed being natural, and not the superinduced result of solitude and seclusion. They bear the winter well, but in severe weather will come into a fold to eat hay, although they will not taste turnips. They are seldom allowed to live more than 8 or 9 years, at which period they begin to go back. When slaughtered the steers are usually 6 years old and weigh about 5 cwts. The beef is finely marbled, but in taste scarcely distinguishable from that of the domestic ox when fed on grass. By taking the calves at a very early age and treating them gently, the present keeper succeeded in domesticating an ox and a cow. They became

as tame as domestic animals, and the ox fed as rapidly as a short-horned steer. He lived 18 years, and when at his best was computed at 8 cwts. 0 qrs. 14 lbs. The cow only lived 5 or 6 years. She gave little milk, but the quality was rich. She was crossed by a country bull; but her progeny very closely resembled herself, being entirely white, excepting the ears, which were brown, and the legs, which were mottled. In their wild state few die from disease, and in the present keeper's time only two from calving. Mr. Baily states that when any one happens to be wounded or has become weak and feeble through age or sickness, the rest of the herd set upon it and gore it to death. This characteristic is an additional and strong proof of their native wildness.

It is remarkable that during the 33 years Mr. Cole has been keeper he has perceived no alteration in their size or habits from in-breeding, and that at the present time they are equal in every point to what they were when he first knew them. About half a dozen, within that period, have had small brown or blue spots upon the cheeks and necks; but these, with any defective ones, were always destroyed.

Although Chartley appears to be the only place where wild cattle *similar* to those of Chillingham are *now* to be found, down to the middle and latter end of last century, there were some at Burton Constable in Yorkshire, and at Drumlanrig in Dumfries-shire, which corresponded to them in almost every respect. Those of Burton Constable (which were swept off by a distemper) alone differed from them in having the ears, muzzles, and tips of the tails black, whilst in their habits and native wildness they were exactly similar. Those of Drumlanrig are described in the following extract from a letter addressed by the clergyman of the place to the writer of this paper, under date of the 10th July of the present year. He says, "In what year the wild cattle came to Drumlanrig I have not been able to ascertain. The breed are described as being all white, with the exception of the ears and muzzle (which were black) and without manes. They went under the appellation of the wild Caledonian cattle." They were driven away about the year 1780.

Of the high antiquity of the Chillingham breed of wild cattle,

the facts and reasonings contained in the Earl of Tankerville's letter are sufficient proof. The testimony of the two Moscrops, connected with the contemporaries of the first Moscrop, would almost carry us back a period of 200 years, when their origin seemed to be veiled in the same obscurity as at present exists respecting it. To this must be added the negative proof derivable from the absence of all record of their introduction into the park; for had they been brought there in times in any degree modern, a circumstance so remarkable was almost sure to have been recorded and handed down in a place that has so long been the principal residence of a noble family. On the contrary supposition that they are the native inhabitants of the park; no such record was to be expected; for succeeding generations growing up with this familiar knowledge, were no more likely to register the circumstance than that the sun had risen and set every day during their lives. Their antiquity is *unquestionable*; and when we connect this fact with their natural wildness and characteristic purity, we can scarcely doubt that they are the genuine remains of the aboriginal cattle of the north of England or of Scotland. Of the ancient cattle of this district no historic record can be found sufficient to mark their character and peculiarities; but of the Caledonian wild cattle we find a very particular and curious account in Boethius, who was born in 1470, and published his 'Historia Scotorum' at Paris in 1526. From the edition of 1574, fol. 6, line 63, we extract the following passage:—

"Adjacet Argadiæ ac Lennos in mediterraneis ager Stirlingi et Monteth, inde haud procul ejusdem nominis oppidum Stirlingum cum fortissimo Castello, cui olim nomen fuit Monti doloroso. Hic initia olim fuere Calidoniæ sylvæ, manentibus videlicet veteribus adhuc nominibus Callendar et Caldar. Excurrens per Monteth et Erneuallem longo tractu ad Atholiam et Loquhabriam usque, gignere solet ea sylva boves candidissimos in formam leonis jubam ferentes, cætera mansuetis simillimos, verum adeo feros indomitosque atque humanum refugientes consortium, ut quas herbas, arboresque, aut frutices humana contrectatas manu senserint plurimos deinceps dies fugiant: capti autem arte quapiam (quod difficillimum est) mox paulo præ mœstitia moriantur. Quum vero sese peti

senserint, in obvium quencunque magno impetu irruentes eum prosternunt, non canes, non venabula, nec ferrum ullum metuunt." And after narrating the wonderful deliverance of Robert Bruce from one of these wild bulls by the courage and prowess of a man who was, in grateful commemoration of the circumstance, afterwards named by the king Turnbull, he adds, "Cæterum quum tota olim sylva nasci ea solerent; in una tantum nunc ejus parte reperiuntur, quæ Cummernald appellatur, aliis gula humana ad internecionem redactis." This description is confirmed by Bishop Leslie in his 'De Origine, Moribus, et Rebus Gestis Scotorum,' published at Rome in 1578, 52 years after the work of Boethius. At page 18 of the edition of 1675, he says,—

"In Calidonia olim frequens erat sylvestris quidem bos, nunc vero rarior, qui colore candidissimo, jubam densam, ac demissam instar leonis gestat, truculentus, ac ferus ab humano genere abhorrens, ut quæcunque homines vel manibus contrectarint, vel halitu perflaverint, ab iis multos post dies omnino abstinuerint . . . . Ejus carnes cartilaginosæ, sed saporis suavissimi. Erat is olim per illam vastissimam Calidoniæ sylvam frequens, sed humana ingluvie jam assumptus, tribus tantum locis est reliquus, Strivilingi, Cummernaldiæ, et Kincarniæ."

These passages are most important, not only for their very minute description of the wild Caledonian cattle, but for the light which they throw upon the cause of their almost total extermination. Even in the time of Boethius they had been reduced by an almost universal slaughter to a small remnant; and it has been stated that upon the dissolution of the monastic establishments of Scotland the few that remained were transferred to Drumlanrig.

On comparing the descriptions of the wild Caledonian cattle given by Boethius and Leslie with the previous account of the Chillingham breed at the present day, we cannot but be struck with their generally close correspondence. Bating a little hyperbole in the style of the old historians, the resemblance is complete in almost every point, excepting that the Chillingham cattle want the lion-like manes ascribed to the Caledonian race. This point alone seems to offer any difficulty in

the way of their complete identification; and whether comparative confinement and in-breeding are sufficient to account for this difference in the Chillingham cattle must be matter of opinion. In other animals they are undoubtedly powerful agents of change and modification, and possibly they may in some measure have lessened the ruggedness of this species. Besides, without questioning the general accuracy of Boethius or Leslie, the characteristic style of the passages would seem fairly to lead us to interpret the statement respecting their leonic manes more by the rule of *poetic* than of exact zoological description. But if we admit (what can scarcely be doubted) that the wild cattle of Drumlanrig were the descendants of the ancient Caledonian breed, this sole obstacle vanishes; for *they* had no manes, and their general resemblance to the Chillingham race is complete. It is true that in the colour of the ears there is a trifling difference, but this appears to be an occasional variety in the species; for Bewick states that about 40 years ago some of those at Chillingham had black ears, that the keeper destroyed them, and that since that period this variation has not recurred. The identity of the Drumlanrig cattle with those described by Boethius being granted, that of the Chillingham breed can scarcely be denied.

Upon the whole, we are inclined to believe that the same species of wild cattle prevalent in Scotland had extended to the northern districts of England; that in proportion as population and culture advanced, they became here, as in Scotland, the subjects of almost universal slaughter; and that a few of those that escaped had found sanctuary in the great wood of Chillingham (as well as in some other ancient forests), where they escaped the fury of their destroyers. The only other tenable hypothesis is, that after the inclosure of the park at Chillingham, they had been brought from Scotland and located there as a relic of the ancient Caledonian cattle; but the absence of all tradition and record upon the subject, and the circumstance of a similar breed having been found in places far removed from the Borders, render this supposition less probable than the former.

In speculations of this nature, when the data are so scanty, we can scarcely expect to arrive at absolute certainty, but suf-

ficient has we think been advanced to justify the hypothesis that these are the genuine remains of the ancient cattle of the country, and too much praise cannot be given to the public spirit of their present noble proprietor for his zealous care to preserve, pure and untainted, this interesting relic of the zoology of former times.

Alnwick, August 18, 1838.

Note.—The Earl of Tankerville, in writing to Mr. Children that he would most kindly send a skin and skull of the wild oxen of Chillingham to the British Museum collection, communicated the following interesting particulars, which we have taken the liberty of adding to Mr. Hindmarsh's paper:—

"I forgot to mention in my letter to Mr. Hindmarsh a curious circumstance with respect to the continuation of the breed of the wild cattle. Several years since, during the early part of the lifetime of my father, the bulls in the herd had been reduced to three; two of them fought and killed each other, and the third was discovered to be impotent; so that the means of preserving the breed depended on the accident of some of the cows producing a bull calf."—J. E. Gray.

XXXIII.—*On some new or little known Mammalia.* By John Edward Gray, F.R.S., Senior Assistant of the Zoological Department of the British Museum.

[With two Plates.]

Captain Clapperton and Colonel Denham, when they returned from their expedition in Northern and Central Africa, brought with them two heads of a species of ox, covered with their skins. These heads are the specimens which are mentioned in Messrs. Children and Vigors' accounts of the animals collected in the expedition, as belonging to the buffalo, *Bos Bubalus*, and they are stated to be called *Zamouse* by the natives; but, as no particular locality is given for the head, this name is probably the one applied to the common buffalo, which is found in most parts of North Africa.

Having some years ago compared these heads with the skull

of the common buffalo, *Bos Bubalus*, and satisfied myself from the difference in the form and position of the horns that they were a distinct species, in the 'Magazine of Natural History' for 1837 (new series, vol. i. p. 589), I indicated them as a new species, under the name of *Bos brachyceros*.

In the course of this summer, Mr. Cross, of the Surrey Zoological Gardens, received from Sierra Leone, under the name of the *Bush Cow*, a specimen which serves more fully to establish the species. It differs from the buffalo and all the other oxen in several important characters, especially in the large size and peculiar bearding of the ears, and in being totally deficient of any dewlap. It also differs from the buffalo in its forehead being flatter and quite destitute of the convex form which is so striking in all the varieties of that animal.

Mr. Cross's cow is, like the head in the Museum, of a nearly uniform pale chestnut colour. The hair is rather scattered, and nearly perpendicular to the surface of the body. The legs about the knees and hocks are rather darker. The ears are very large, with two rows of very long hairs on the inner side and a tuft of long hairs at the tips. The body is short and barrel-shaped, and the tail reaches to the hocks, rather thin and tapering, with a tuft of long hairs at the tip. The chest is rounded and rather dependent, but without the least appearance of a dewlap, and the horns nearly resemble those of the Museum specimen, but are less developed, from the sex and evidently greater youth of the animal. The Rev. Mr. Morgan informs me that the animal is not rare in the bush near Sierra Leone.

In the size of the ears this species has some resemblance to the "Pegasse of Angola, *Bos Pegasus*" of Colonel Hamilton Smith, indicated and figured in Griffiths' 'Animal Kingdom,' from a figure which this industrious zoologist found in a collection of drawings formerly the property of Prince Maurice of Nassau, now in the Berlin Library, which Colonel Smith thinks was probably intended to represent the Pegasses of Congo, mentioned by the Jesuits, and said to have "ears half a yard in length." But our animal differs from that figure in the ears being nearly erect, and in the horn being of quite a different form and direction. I have added a slight sketch of Mr. Cross's animal (Plate XIII.), which I hope will en-

able any person to distinguish this very distinct and interesting addition to the species of this useful genus.

In the same paper in which I described the preceding species there is the description of a new genus of otter from Demerara, "which is intermediate between the *Lutra* and *Enhydra*," differing from both in the side of the tail being expanded into a slight fin and in the large size of the fore and hind feet. In a late number of Professor Wiegmann's Archiv, Part IV. 1838, he has expressed a doubt if the genus is distinct from *Enhydris*, I have therefore added to this paper a copy of a sketch (Pl. XIV.) of the animal, which Mr. Gould was so kind as to make for me from the original specimen at the meeting of the British Association at Liverpool. I think that it will at once dispel M. Wiegmann's doubt, for the tail is much longer (though it is represented in the sketch rather too short for my measurement, taken from the animal) and more slender, and the fore feet are much larger, and the hind ones smaller than in the sea otter, which induced me in the original description to observe, that the hind feet are "intermediate in size between those of the otter and the fin-shaped feet of the *Enhydræ*."

In the Proceedings of the Zoological Society and in the paper above referred to, I described an animal from the island of the Indian Archipelago, from two specimens, one of which was in Sir Stamford Raffles' collection, and one purchased by the British Museum. Some time after this description, M. Blainville, in a paper in the 'Annales des Sciences Naturelles,' figured the skull of this animal under the name of *Viverra Carcharias*; and more recently Dr. S. Muller has published a description of it in his account of the animals which he discovered in Borneo, and has formed for it a new genus, which he calls *Potamophilus barbatus*. He says that it is called *Mampalon* by the natives of Borneo, and that the genus had not before been described. The name must however be changed, as it has already been used in zoology.

While referring to the animals in the Surrey Zoological Garden, I may remark, that on examining the eyes of *Herpestes Smithii*, described in the paper above referred to, which was lately in that collection, but which Mr. Cross, with the desire which he has always shown of making his collection as

useful as he can to the purposes of science, most liberally on its death presented to the National Collection, I was struck with observing that the pupils of its eyes are oblong and horizontal like those of the herbivorous quadrupeds, instead of being vertical like some of the Feline tribes; for in the Proceedings of the Zoological Society I observed that the pupils of the eyes of most of the Feline animals are round, and not elliptical and vertical as they are generally described.

We have lately received from M. Wahlberg a specimen of the water shrew from North Bothnia, which he considers as a *Sorex fodiens.* It is quite different in the length of the tail from our English species, which in the Proceedings of the Zoological Society I have called *Amphisorex Pennantii,* and I therefore propose to call it *A. Linneana.* They may be thus described :—

Amphisorex Pennantii. Blackish-brown, upper lip and beneath white, legs blackish, feet grey, tail rather more than half the length of the body and head.

Var. With a white spot near the ears.

Body and head 39 to 42; tail 21 to 23 lines.

Inhab. England.

Amphisorex Linneana. Black, upper lip and beneath white, legs black, feet grey, tail two-thirds the length of the body and head.—*Var.* With a white spot behind each eye.—Body and head 47; tail 33 lines.

Inhab. North Bothnia.

XXXIV.—*Catalogue of the Slender-tongued Saurians, with Descriptions of many new Genera and Species.* By John Edward Gray, Esq., F.R.S., Senior Assistant in the Zoological Department of the British Museum, &c.

[Continued from vol. i. p. 394.]

E. (*Antarchoglossæ*). Tongue contractile; head shielded; scales imbricate.

Fam. IX. Scincidæ.

Tongue contractile; head shielded; rostral shield small; eye-lid distinct; belly and sides (and generally the back) covered with smooth uniform imbricate scales; vent transverse, linear, with scales in front.

* *Muzzle produced, subacute, body fusiform, flat beneath, subangular on the sides* (Scincidæ veræ).

Scincus. Ears small with scales in front; toes short, fringed on the sides.

Scincus officinalis, Schn. Savig. Rept. Egypt. t. 2. f. 8.

Egypt. Brit. Mus.

Sphænops, Wagler. Ears none; toes subcylindrical.

Sphænops sepsoides, Reuse. Scincus sepsoides, *Geoff.* Sphænops capistratus, *Wagler.* Scincus brachypus, *Schn. Savig. Rep. Egypt.* t. 2. f. 9—10.

Egypt. Brit. Mus.

** *Muzzle rounded; body fusiform, rounded beneath; limbs* 4, *moderate; toes* 5—5.

Celestus. Head with two pair of supernasal scales before the frontals; ears large; femoral pores none; scales finely radiately grooved; ears distinct.

Celestus striatus. Silvery.

Hab. ——? Brit. Mus.

Tachydosaurus, *Gray. Brachydactylus,* A. Smith. Head shields normal, (with one pair of supernasal shields) thick, convex and hard; scales hard, bony; femoral pores none; ears distinct.

Tachydosaurus rugosus, Wagler, Amph. Scincus pachyurus, *Peron.*

Young.—Pale brown, yellow varied. *Brachydactylus typicus,* A. Smith.

New Holland. Brit. Mus.

Egernia, Gray. Head shields normal, rugulose, subsquamose; scales of back and limbs three-keeled, of tail spinose, verticillate; femoral pores none; ears distinct.

Egernia Cunninghami, Gray. Tiliqua Cunninghami, *Gray, Proc. Zool. Soc.*

New Holland. Brit. Mus.

Tiliqua, Gray. Head shields normal, regular; scales thin, three-keeled or smooth; femoral pores none; ears distinct.

a. Front of ears with 3 or 4 scales.

* *Scales smooth, ear-scales rather large.*

Tiliqua Whitii, Gray. Lacerta scincoides, *Shaw, Zool.* t. 81.

New Holland. Brit. Mus.

Tiliqua elegans, n. s. Pale; spots on the back, streak on sides of the neck and body whitish (brown?) in spirits; scales thin, smooth, in 8 series on the nape.

Hab.—— Brit. Mus.

Scincus multiseriatus, Cuv. *Scincus cyprinus,* Cuv., and *Tiliqua trivittata,* Illust. Ind. Zool. t. appear to belong to this section.

** *Scales smooth; ear-scales small.*

Tiliqua cyanura. Scincus cyanurus, *Lesson.*

New Guinea.

Tiliqua chinensis, n.s. Silvery, olive, polished; lateral scales brown edged; beneath white; hind toes unequal, white; tail longer than the body.

China. Brit. Mus.

Tiliqua tæniolata. Lacerta tæniolata, *Shaw, White's Journ.* t. 32. f. 1. Scincus undecim-striatus, *Kuhl.*

N. Holland. Brit. Mus.

Tiliqua Labillardii. Scincus Labillardii, *Cocteau.*

Hab. ——. Brit. Mus.

Tiliqua vanicoriensis. Scinc. vanicoriensis, *Lesson.*

Vanicoro. Brit. Mus.

*** *Scales three-keeled; ear-scales small.*

Tiliqua bistrigata, Gray, Griff. Anim. Kingd.

Madagascar. Brit. Mus.

Tiliqua punctata, n. s. Brown olive, whitish speckled, beneath silvery, scales brown edged; head pale, brown spotted; tail much longer than the body and slender; toes slender.

Fernando de Noronha. Brit. Mus.

Tiliqua maculata. Olive brown, white spotted; tail elongate, tapering; toes thick.

Demerara. Brit. Mus.

Tiliqua fasciata, Gray, Griff. Anim. Kingd. Euprepis fasciatus. *Reuse,* Mus. Senkenb. t. 3. f. 2.

Brazils. Mus. Frankfort.

Tiliqua carinata, Gray, Zool. Journ. Scincus carinatus, *Schn.* Sc. rufescens, *Cuv. Règ. Anim.* Sc. bilineatus and Lacerta lateralis, *Kuhl.*

? Var. Back banded. *Scincus nigrofasciatus* and *Sc. multicarinatus,* Kuhl.

India. China.

Tiliqua subrufa, n. s. Pale whitish, with 6 rather interrupted brown streaks and a pale lateral streak; hind toes very unequal, elongate, slender.

Hab.—— Brit. Mus.

Tiliqua affinis, n. s. Pale brown, beneath paler; dorsal scales

three-keeled, ends truncated, three-toothed; hind toes unequal, elongated, rather slender.

Hab.—— Brit. Mus.

Tiliqua quinquestriata. Pale olive with broad longitudinal streaks, beneath pale; sides of neck behind the ears black varied, chin brown, white spotted.

Hab. ——. Brit. Mus.

Tiliqua Napoleonis. Scincus Napoleonis, *Cuv.* Brown with three pale dorsal streaks; ear-scales four, large; scales three-toothed behind, three-keeled.

New Holland.

Tiliqua punctata. Pale brown, pale yellow beneath, sides of the neck and outside of limbs with small yellow spots; tail rather long, tapering; toes rather short, strong.

Hab. ——. United Service Museum.

**** *Scales 5 or 6-keeled, ear-scales large.*

Tiliqua nigrolutea. Scincus nigroluteus, *Quoy.*

Jun.—Scinc. erucotis, *Peron, MSS.*

New Holland. Brit. Mus.

Tiliqua Kingii, Gray. Scinc. Nicitensis, *Cocteau, MSS.* Dark brown with small pale spots at the tip of the scales, beneath pale, brown spotted; scales 4 or 5 ridged.

New Holland. Brit. Mus.

Tiliqua Bibronii. Scinc. Bibronii, *Cocteau.* Grey; nape with a black edged white line; sides of head and body with a whitish edged blackish streak; scales with 5 sharp keels.

Hab. ——. Mus. Paris.

Tiliqua capensis, Gray, Griff. Anim. Kingd. Scinc. trivittatus, *Cuv. Règ. Anim.* not *Gray.* Brown with three longitudinal paler streaks, with a series of black spots between the lines.

Cape of Good Hope.

b. Ears nearly hidden by the series of scales in their front being produced and pressed down on them, but without any distinct series for the purpose.

* *Scales 3-keeled.*

Tiliqua Ascensionis. Pale brown with dark transverse oblong spots, and 3 or 5 longitudinal streaks, the central streak broad, the others narrower; toes short, rather thick.

Island of Ascension. Brit. Mus.

** *Scales smooth.*

Tiliqua tenuis, Gray, Griff. Anim. Kingd. 71. Scinc. crucotis, *Peron, MSS.*

New Holland. Brit. Mus.

Tiliqua Stoddartii. Scales smooth; pale olive, scales darker edged; upper part of sides, side of head, and base of the tail with broad black bands; upper lip, sides, throat, and beneath white; lips black spotted; limbs darker varied; toes unequal.

New Holland, Mr. Stoddart. Mus. Chatham.

Tiliqua Vachellii. Black with 3 longitudinal brown streaks, the middle one becoming wider behind, and marked with a row of small spots between the upper bands, and 2 rows of spots on each side, the lower ones largest; sides brown banded; head and lips pale, orbits and face shields black varied; beneath pale; tail pale, base slightly black spotted.

New Holland. Mus. Chatham.

Tiliqua leucopsis. Ears deep, with 3 (rarely 4) unequal distinct white scales in front; scales smooth, olive, black varied; back with 2 black streaks interrupted with brown spots; edge of eyelids and scales in front of the ears pure opake white, beneath silvery; toes elongate, unequal; tail elongate, olive, the upper part of the base black spotted.

New Holland. Brit. Mus.

Tiliqua australis. Ears deep, with 4 unequal rather large white scales in front; scales smooth, brown edged; above olive with 4 blackish brown longitudinal streaks; the central streak silvery edged, and the two lateral ones only separated by a lateral silvery streak; the side brownish white dotted, beneath silvery; tail olive with two brown-edged silvery streaks on each side of its base.

New Holland. Brit. Mus.

Tiliqua Buchananii, Gray. Ears shallow, overlapped by 2 or 3 whitish superficial scales; scales smooth, olive, black lined; above black and olive varied; back with a broad black-edged silvery streak on each side; limbs, tail, and sides olive and black dotted, beneath silvery.

New Holland. Brit. Mus.

Tiliqua trilineata. Ears deep ——; scales hexangular, olive, darker edged, with 3 black longitudinal grooves; above olive, with narrow black lines between the scales; with a silvery, and below it a broad black, line along each side; beneath silvery; tail elongate, compressed; toes unequal, slender.

New Holland. Brit. Mus.

c. Ear holes large, deep, not fringed in front.

* *Scales smooth.*

Tiliqua occidua. Lacerta occidua, *Shaw, Zool.* iii. 288.; *Sloane, Jam.* ii. t. 273. f. 9.

Jamaica. Brit. Mus.

Tiliqua similis, Gray.

Hab. ——. Brit. Mus.

Tiliqua Bellii, n. s. Scincus Telfairii, *Cocteau, MSS.* Pale brown, mottled with darker brown and with pale oblique cross bands; beneath silvery; head uniform; toes short, thick; tail rather compressed; scales rather small in many series at the nape.

Madagascar. Brit. Mus.

Tiliqua erythrocephala. Scinc. erythrocephalus, *Gilliams, Jour. Acad.* N. S. P. t. 18. f. 2.

North America. Brit. Mus.

Tiliqua ocellata. Scinc. ocellatus and Scinc. variegatus, *Schn.* Scinc. Tiliqua, *Daud.* iv. f. 56. Lac. ocellata, *Linn.* Geoff. Rep. Egypt. t. 5. f. 2.

Europe, Sicily, Egypt. Brit. Mus.

Tiliqua Richardi. Scincus Richardi, *Cocteau MSS.* Bronze; head and neck with 4 black streaks.

St. Thomas. Mus. Paris.

Tiliqua Duperreyi. Scinc. Duperreyi, *Cocteau MSS.* Scales with 5 white lines like those of *Gymnophthalmus.*

Kangaroo Island. Mus. Paris.

Tiliqua Entrecasteaux. Scinc. Entrecasteaux.

Van Diemen's Land. Mus. Paris.

Tiliqua microcephala, n. s. Olive, varied with black scales, marked with a narrow central streak and with an indistinct pale streak on each side of the back; beneath whitish; legs short; toes short, stout.

Shores of Mediterranean. Brit. Mus.

Tiliqua ænea, Gray, Griff. Anim. Kingd. 70. Scinc. mabouya, *Cocteau.*

West Indies. Brit. Mus.

Tiliqua albolabris, n. s. Golden-green with a brown streak on each side the head and body (inclosing the eyes and ears) edged above and below with a pale streak; lips white; tail elongate.

Hab. ——. Brit. Mus.

Tiliqua Reevesii, n. s. Golden green with a pale spotted black

streak on each side of the head, body, and tail; beneath silvery; tail very long, slender; feet moderate.

China. Brit. Mus.

Tiliqua Sloanii, Gray, Griff. Anim. Kingd. (non Syn.)

Hab. ——. Brit. Mus.

** *Scales not keeled; finely closely striated.*

Tiliqua striata. Brown; darker varied, sides with slight irregular dark edged white cross bands; ears large, open, round; limbs and tail brown varied.

Jamaica. Mus. Chatham.

*** *Scales with a central keel and finely longitudinally striated.*

Tiliqua Jamaicensis. Back pale brown; neck with 2, back with 8 dark edged pale cross bands; palms and soles with large tubercles; ears large, round.

Jamaica. Mus. Chatham.

**** *Scales strongly 3-keeled.*

Tiliqua Fernandi, Burton, Proc. Zool. Soc. 1837. Pale brown; sides of body brown varied and white spotted, of tail brown, white spotted; beneath white, throat brown streaked; toes short, thick, strong.

Fernando Po. Brit. Mus.

Tiliqua interrupto-punctata. Back olive brown, varied with two narrow pale streaks on each side; sides black, with three continued white streaks, the lower one broadest and most indistinct, the two upper ones continued on the base of the tail; beneath white; tail brown.

Africa, Sierra Leone.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

The Honey-Bee, its Natural History, Physiology, and Management. By Edward Bevan, M.D. Van Voorst, 1838. 12mo.

We are glad to see a new edition of this excellent work. The subject is one of never-failing interest; and if we may judge from the numerous treatises on bees yearly issuing from the press, both in separate volumes and as articles in scientific periodicals, the interest felt in these wonder-working insects appears to be on the increase. Dr. Bevan's 'Honey-Bee' has contributed materially to produce this effect, for since the publication of Huber's 'Nouvelles

Observations sur les Abeilles' in an English dress in 1806, we know of no treatise on the subject equal to the 'Honey-Bee' for accuracy of information in respect to the natural history of the insect and minuteness of practical detail.

The work is divided into two parts, of the first of which nearly 50 pages are occupied with a general view of the history and physiology of the bee, as far as relates to the personal description of the three essential members of the bee community, viz. the queen, the worker, and the male or drone, particularly as respects the impregnation of the queen, the effects of its retardation, and the laying and hatching of the eggs. The author then proceeds to give detailed instructions for the practical management of the bee, comprehending descriptions of the œconomy of the apiary, of the best form of hives, of the mode of proceeding during the season of swarming, of feeding, protecting, and transporting the bees at the proper periods, and of the manipulation of honey and wax.

In Part II. Dr. Bevan gives an account of the anatomy of the bee; enters into a more enlarged detail of its physiology than had been given in Part I., and discusses at considerable length, and with great perspicuity, the senses, instincts, and the wonders of its architecture.

The work is distinguished by sound philosophical views, and is written in a style of classical elegance and simplicity. The author professes not to offer much in the way of original discovery, but to give a popular view of the present state of apiarian knowledge, historical, physiological, and practical; and that he has succeeded in his object, the well-deserved popularity of his book, and the consequent call for a new edition, furnish abundant evidence. The first edition was deficient in point of arrangement; this has been satisfactorily remedied: many particulars connected with the natural history of the insect, formerly stated but briefly, have been enlarged or modified conformably with the more advanced state of the science, and some additional directions have been given as to practical management, which well deserve the attention of the bee-master.

Plantæ Javanicæ Rariores, descriptæ iconibusque illustratæ, quas in Insula Java, annis 1802—1818, *legit et investigavit* T. Horsfield, M.D. *e siccis descriptiones et characteres plurimarum elaboravit* J. J. Bennett; *observationes structuram et affinitates præsertim respicientes passim adjecit* R. Brown. Part I.—Allen and Co., Leadenhall Street, 1838.

[Continued from p. 222.]

The twelfth article relates to *Conocephalus suaveolens*, Bl., a genus referrible to Mr. Brown's family of *Artocarpeæ*, and nearly related

to the *Coussapoa* of Aublet. With this genus Mr. Bennett compares it, as also with *Cecropia* and *Musanga*, a genus indicated by Mr. Brown in the Appendix to Captain Tuckey's Narrative; and after noticing the characters common to all the genera named, proceeds to give their generic distinctions, all of them except *Cecropia* being but little known, and one of them (*Musanga*) not having been previously described. He adds also the characters of the male flowers of the genus *Myrianthus* of Palisot de Beauvais, with the double view of affording materials for comparison with those of *Musanga*, (to which Mr. Brown long since pointed out their resemblance), and of introducing a correction in those given by M. de Beauvais. He refers to M. Gaudichaud's classification of *Urticeæ*, in which *Conocephalus* is widely misplaced; and incidentally observes that the *Hedycarya* of Forster, referred by M. Gaudichaud to *Artocarpeæ*, "is much more nearly related to that very distinct division of the class (as *Urticeæ* are now, in accordance with Mr. Brown's views, generally considered) which was long since separated by Jussieu under the name of *Monimieæ*."

The thirteenth article contains a long historical notice of the *Antiaris toxicaria*, Lesch., the celebrated *Upas* or Poison-tree of Java, on the subject of which so many marvellous tales have long passed current. Mr. Bennett traces the history of this poison through a long succession of writers, from De Bry's 'India Orientalis,' down to the most recent times, including among many other of the older names, those of Herbert, Bontius, Tavernier, Nieuhof, Spielman, Kamel, Kæmpfer, Valentyn, and Rumphius; all of whom relate, either from their own observation or on the testimony of natives of Macassar, Java, Luçon and the Moluccas, various particulars concerning it. In these accounts much of truth and no little falsehood are mingled together; "quis enim," as Kæmpfer observes, "quicquam ex Asiaticorum ore referat, quod figmentis non implicetur?" In all these cases, indeed the falsehood may fairly be traced to the extravagant assertions of ignorant or interested natives, and implies in the authors named no greater blame than that of a credulity common to the age in which they lived. Not so in the narrative of Færsch, by which the fabulous history of the tree has been most widely spread, and which has since been demonstrated to be, from beginning to end, a tissue of inventions, founded on the absurd and marvellous stories current among the natives, and scarcely relieved by a single particle of truth, except the fact (then for the first time stated, but long afterwards considered doubtful) that the tree grows in the island of Java. The inquiries of travellers were, however,

stimulated by the sensation produced by this impudent fabrication, but their researches remained for some time fruitless; and it was reserved for M. Deschamps, M. Leschenault, Dr. Horsfield, and more recently Dr. Blume, to supply us with authentic information on the subject. An abstract of the information thus obtained (with the exception of that contained in Dr. Blume's valuable dissertation, which did not appear until some time after this article was written); and a notice of some of the experiments made with the poison by Sir Benjamin Brodie and others, and of its chemical analysis by MM. Pelletier and Caventou, complete the history of the Antiar as here given by Mr. Bennett. A few words are added on the subject of the botanical affinities of the genus, together with some remarks on the distinctive characters of the two species which are known to belong to it.

Pouzolzia pentandra, described by Mr. Bennett in the succeeding article, belongs to one of the generic (or probably rather subgeneric) divisions of *Parietaria*, distinguished by M. Gaudichaud, in his sketch of a classification of *Urticeæ*. The species of *Pouzolzia*, which are numerous, are again capable of subdivision into two very distinct and natural sections, dependent on the development or non-development of wings on the fructiferous calyx. Of the species of the winged section known to him, which are nine in number, Mr. Bennett gives a synopsis, and offers some observations on those of the sulcated and wingless group, and on the species indicated by M. Gaudichaud. He refers to the terms employed by M. Gaudichaud in characterizing his sections of true *Urticeæ* as indicative of the belief of that author in the existence of a second point of attachment of the ovulum at its apex; and states that "the supposed superior point of attachment of the ovulum has always proved, on a close examination, to be merely a membranous and somewhat tubular elongation of the margin of the testa surrounding the aperture, which is thus placed in close and immediate contact with the base of the style," and in which he has "never been able to perceive the slightest trace of a vascular connexion." He also notices an oversight of Professor Lindley in describing the entire family of *Urticeæ*, as having the "radicle always pointing to the hilum," the contrary structure being well known to exist in the great majority of the genera; and concludes by pointing out some analogical resemblances between *Pouzolzia*, and certain genera of *Polygoneæ* and *Chenopodeæ*.

In the article which follows, on *Gunnera macrophylla*, Bl., Mr. Bennett gives a history of the genus, and adverts to the singular variety of errors to which it has at various times given rise, as regards

its structure and classification, both in the Linnæan and natural system. "The description of *Gunnera macrophylla* and the accompanying figure," he observes, "abundantly prove that the affinities of the genus have been altogether misunderstood, and that it bears at most but a distant relation to *Urticeæ*, from which it differs in almost every important feature except its solitary seed. It seems indeed surprising that a genus known to possess 'germen inferum,' should have been so long referred to an order in which, even where a partial adhesion takes place of the calyces *inter se*, as in *Artocarpus*, not the smallest tendency exists to their adhesion with the ovaria. But when to this we add the presence of distinct petals, the removal of the genus not only from the order, but also from the class to which that order is referred, is clearly indicated." On the subject of its real affinities, Mr. Bennett adds that Mr. Brown communicated to him in 1835 some highly curious and interesting views, into the detail of which he was precluded from entering by Mr. Brown's absence from England while this article was passing through the press; and expresses a hope that he will himself hereafter make them fully known. A synopsis of the known species of *Gunnera* completes the account of this interesting plant.

A curious Piperaceous genus, to which Dr. Blume has given the name of *Zippelia*, chiefly remarkable on account of the glochidiate prickles with which its berries are muricated throughout, forms the subject of the sixteenth article. In it Mr. Bennett makes some observations on the question, now no longer doubtful, of the monocotyledonous or dicotyledonous character of the embryo of the genus *Piper*; and notices some of the obscure genera which have been described as belonging to this restricted family.

Tetrameles nudiflora, the only known species of a genus named and characterized by Mr. Brown in the Appendix to Denham's Narrative, forms the subject of the succeeding article. Along with *Datisca* it constitutes "an order very different from any other yet established," to which Mr. Brown has given the name of *Datisceæ*. The difference between the two genera in habit and in some minor points of structure is considerable; but in all essential particulars they are most intimately allied. Mr. Bennett incidentally observes that the supposed second species of *Datisca*, described by Linnæus under the name of *Datisca hirta*, belongs unquestionably to the genus *Rhus*, the specimen in the Linnæan Herbarium being most probably only a contracted specimen of the common *Rhus typhina*.

In the next article, under the head of *Helicia Javanica*, Mr. Bennett illustrates the history and characters of a Proteaceous genus,

established by Loureiro, and now consisting of eleven species, of which a synopsis is here given. It comprehends all the Asiatic *Proteaceæ* at present known.

The nineteenth and twentieth articles relate to two species of *Rhododendrum*, of which Dr. Blume had formed a genus under the name of *Vireya*. Mr. Bennett states, however, that they do not differ in any respect from the former genus. The first described, *Rhod. Javanicum*, is intimately related to *Rhod. Ponticum*, but has larger and more showy flowers; its flowers indeed are the largest in the genus. The second, *Rhod. retusum*, belongs to the same division of the genus with *Rhod. ferrugineum*. In describing them Mr. Bennett speaks of "what is usually regarded as a capitate stigma as an indusium surrounding the true stigmata, which are distinct from each other, equal in number to the cells of the ovarium, partially or wholly adherent to the inner surface of the indusium, sometimes slightly projecting beyond it, and generally a little capitate;" and states that Mr. Brown long since showed him "that a similar organization, more or less obvious, occurs very generally in the family, demonstrating it more particularly in *Salaxis*, and such of the other Heaths as are commonly described as having a large peltate stigma." This structure he regards as bearing an obvious relation to the more strongly marked indusium of *Goodenovieæ*.

In the next article Mr. Bennett characterizes a new genus of *Asclepiadeæ*, nearly related to *Hoya*, but differing from it in some striking, if not very essential, characters. To this genus he gives the name of *Cyrtoceras*, and derives its principal distinctive character "from the great comparative elongation of the whole of its sexual apparatus, which in *Hoya* is as remarkably depressed." We may add that it is the *Centrostemma* of M. Decaisne, since published in the 'Annales des Sciences Naturelles,' Nouv. Série, tom. ix. p. 271.

In the twenty-second article Mr. Bennett describes a species of the genus *Argostemma* of Dr. Wallich, which M. De Candolle has placed in immediate apposition with *Ophiorhiza*, but which Mr. Bennett considers, in accordance with a suggestion of Mr. Brown, to be much more closely related to *Hoffmannia*. He enters into a detailed examination of the more remarkable characters of the genus, and gives a synopsis of the species at present known, twenty-one in number, of which thirteen are here characterized for the first time.

The twenty-third article offers a striking instance of one of those fortunate recoveries of lost plants, which sometimes reward the labours of the botanist far more agreeably than the discovery of new. It relates to the Linnæan genus *Lerchea*, which having entirely escaped

the observation of later writers, has been recently discarded even from the lists of genera published by Dr. Bartling and Professor Lindley. Notwithstanding some curious errors in the Linnæan character, one of which led to a singular misplacement of it in the Linnæan system, Mr. Brown satisfied himself of the identity of Dr. Horsfield's plant, with that described by Linnæus, long before he found the latter in the Linnæan Herbarium, in which no specimen existed in its proper place or under its published name. He afterwards discovered, however, among the unarranged plants of that collection two several specimens, one of them accompanied by a MS. generic character under the name of *Codaria*; and both in all respects identical with the plant here figured and described. To the rediscovery of the plant must be added that of its true place in the natural system, which had never even been suspected, the errors of the Linnæan character offering an apparently fatal objection to its position among *Rubiaceæ*, where it will henceforward take its place in the neighbourhood of *Wendlandia*. With this genus, and with the *Xanthophytum* of Dr. Blume, Mr. Bennett compares it, and states that he is strongly inclined to regard it as identical with a species originally referred by that author to *Chiococca*, but since transferred by him to *Xanthophytum*. He describes its most remarkable peculiarity as consisting "in the large size and occasional cohesions of its epigynous disk. This disk, which in the early stage forms merely a thickened fleshy ring surrounding the base of the style, and free from any adhesion to the corolla, gradually enlarges in most cases so as completely to fill the lower half of the tube of the corolla, with the thickened and narrowed part of which it at length occasionally coheres below the point of insertion of the anthers, and even sometimes becomes adherent with the latter at their base, as well as with the portion of the style which it surrounds. More commonly these adhesions do not take place; and the fleshy disk is sometimes little or not at all developed beyond its original size."

In the twenty-fourth article Mr. Brown describes, under the name of *Loxotis obliqua*, an elegant little plant of the tribe of *Cyrtandraceæ*, found by himself in the Island of Timor near Coepang in the year 1803, and since collected by Dr. Horsfield and probably also by Dr. Blume in many parts of Java. To the genus Mr. Brown had originally given in his MSS. the name now adopted, but afterwards changed it, on the request of Mr. Ferdinand Bauer (whose drawing, made on the spot, furnishes the materials for a most beautiful plate) for that of *Antonia*, under which it was introduced by Mr. Bauer into a celebrated flower-piece, painted in honour of the late Baron

Jacquin. But the latter name, although well known to the Vienna botanists, having been since applied by Pohl to a South American genus, it has become necessary to recur to that originally given, which may also possibly be set aside if (as there is reason to suspect) the genus should prove to be identical with the *Rhincoglossum* of Dr. Blume. "With regard to the genus itself," Mr. Brown observes, "it may be doubted whether *Loxotis* and *Glossanthus* ought to be generically distinguished merely or chiefly on account of the difference in the number of their antheriferous stamina, especially as they entirely agree in habit, in which there is something peculiar. It is not a little remarkable, that in some of the more minute and less important differences between them, the intermediate structure or connecting link should be found in a species sent by Dr. Schiede from Mexico (*Glossanthus Mexicana*, Br. ined.) and that this should be the only plant belonging to *Cyrtandraceæ* hitherto observed in any part of America."

The twenty-fifth plate, the last of the present part, represents another plant of the same tribe, *Loxonia acuminata*, the letter-press relating to which is postponed to the succeeding part.

Under the head of each plant, Dr. Horsfield has furnished valuable information as to its habit, growth and uses; the precise localities in which it was found by him, particularly noting the height above the level of the ocean; its native name, and such other particulars as his long residence in Java enabled him to collect.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

March 27th, 1838.—William Yarrell, Esq., in the Chair.

A Dugong preserved in spirit having been presented to the Museum by Alexander John Kerr, Esq., of Penang, Mr. Owen communicated to the meeting some notes descriptive of the principal *viscera* in this remarkable aquatic mammal, and a statement of the relative proportions exhibited by its several parts, in comparison with the dimensions of a Dugong published by Sir Stamford Raffles in the Phil. Trans., 1820, and of two other specimens which Mr. Owen had on previous occasions examined in the Society's collection. From these notes, as given in No. 63 of the Society's 'Proceedings,' the following are extracts.

Mr. Owen remarks, that "The external form of the Dugong is not so well calculated for moving rapidly through the water as that

of the Dolphin and other carnivorous *Cetacea*, which subsist by a perpetual pursuit of living animals. In these the snout is conical, and peculiarly elongated, and in some, as the *Delphinus Gangeticus*, the jaws are produced to an extreme length, so as to give them every advantage in seizing their swift and slippery prey; whilst, in the herbivorous Dugong, the snout is as remarkable for its obtuse, truncate character;—a form, however, which is equally advantageous to it, and well adapted to its habits of browzing upon the *algæ* and *fuci* which grow upon the submarine rocks of the Indian seas.

"As, from the fixed nature of the Dugong's food, the motions of the animal during the time of feeding must relate more immediately to the necessity of coming to the surface to respire, its tail, the principal locomotive organ of ascent and descent, is proportionally greater than in the true *Cetacea*, its breadth being rather more than one-third the length of the whole body.

"But the most important external differences are seen in the presence of the *membrana nictitans*, in the anterior position of the nostrils, and in the situation of the *mammæ*, which are pectoral, or rather axillary, being situated just behind the roots of the flippers; in the female specimen examined their base was about the size of a shilling, and they projected about half an inch from the surface.

"A considerable ridge extends along the middle of the upper surface of the posterior part of the back, which is continued upon and terminates in the tail.

"The mouth and tongue corresponded with the descriptions already published of these remarkable structures. The opening of the *larynx* is chiefly defended, during the submarine mastication of the vegetable matters constituting the food of the Dugong, by the extreme contraction of the faucial aperture, which resembles that of the Capybara. It is not traversed by a pyramidal *larynx*, as in the true *Cetacea*.

"The stomach of this singular animal presents, as Sir Everard Home has justly observed, some of the peculiarities met with in the Whale tribe, the Peccari and *Hippopotamus*, and the Beaver: like the first, it is divided into distinct compartments; like the second and third, it has pouches superadded to and communicating with it; and, like the last, it is provided with a remarkable glandular apparatus near the *cardia*.

"To the left of the *cardia* there projects into the stomach a rounded mammilloid eminence, whose base is 2 inches in diameter, and whose *apex* presents an oblique crescentic orifice about 3 lines in diameter; on drawing aside the margins of this orifice, I found that, instead of its

being the outlet of a simple mass of follicular glands, it led to a wide, flattened, winding *sinus*, and that its circumference was formed by the termination of a membrane spirally disposed in about eight or ten turns, and increasing in breadth at each gyration, having both surfaces covered with the orifices of numerous glandular follicles, and the interspaces filled with a cream-like secretion. This structure, which adds another peculiarity to the stomach of the Dugong, and one met with in the *cæcum* only in a few other *Mammalia*, viz. that of having its blind end occupied by a spiral membrane, I have found in all the specimens dissected at the Society; and in each case the gland was infested by *Ascarides*, hereafter to be described, which left impressions upon the spiral membrane.

"The orifice leading to the pyloric cavity of the stomach is provided with a circular and valvular production of the inner membrane of the stomach. Immediately beyond this valve are the orifices of the two cæcal appendages, situated 1½ inch apart at the upper and rather towards the posterior side of the cavity; these orifices were about an inch in diameter, but the inferior orifice was the larger of the two. Small quantities of comminuted sea weeds were found in both these receptacles.

"From the complexity of the stomach, the great extent of the alimentary canal, its vast muscular power, and glandular appendages, the digestive functions must be extremely vigorous in this animal. The vigour of the digestive functions obviously relates, in the herbivorous section of *Cetacea*, to the low organized indigestible character of their nutriment; but the complicated stomach and long intestinal canal of the carnivorous *Cetacea* must have other relations than to the kind of food. These modifications of the digestive system, for example, cannot be so explained in the *Grampus*, which preys on the highly organized *Mammalia* of its own class. It is not to the nature of the food, but to the quantity of nutriment that is required to be obtained from it, that I conceive the peculiarities of the digestive system in the carnivorous *Cetacea* to relate. In no other *Carnivora* is the same quantity of blood, the same mass of fat to be eliminated from the raw material of the food: the digestive system is, therefore, perfected in these warm-blooded carnivorous *Mammalia* to meet the contingencies of their aquatic life.

"The *omentum* is continued from the great curvature both of the cardiac and pyloric divisions of the stomach; though short, it is much more distinctly developed than in the carnivorous *Cetacea*; it contains no adipose matter."

Having described various other particulars connected with the *chy-*

lopoietic viscera, and the individual differences which they presented in the three specimens dissected, Mr. Owen proceeded to observe as follows:—

"The views taken by Cuvier of the natural affinities of the Dugong and other herbivorous *Cetacea*, as expressed in his latest classification, in which they form part of the same order as the carnivorous *Cetacea*, are undoubtedly questionable, and have been dissented from by De Blainville and other eminent authorities in zoology. If, indeed, the object of every good classification be, what Cuvier states it to be, to enable the naturalist to express in general propositions structures and attributes common to each given group, the conjunction of the Dugong with the Dolphin fails in this respect in regard to almost all the important points of internal organization.

"In proceeding with our investigation of the abdominal *viscera*, we find, with respect to the biliary organs, that the Dugong deviates in a marked degree from the ordinary *Cetacea* in the presence of a well-developed gall-bladder. Daubenton found a gall-bladder in the Manatee; but the presence of this organ is not constant in the herbivorous *Cetacea*, for in the Northern Manatee (*Stellerus borealis*, Cuv.), according to Steller*, the gall-bladder is wanting, and its absence seems to be compensated by the enormous width of the *ductus communis choledochus*, which would admit the five fingers united.

"All the three specimens presented the same remarkable extent of separation of the two ventricles of the heart which Raffles and Home have described in the individuals dissected by them, and which Rüppell † observed in the Dugong of the Red Sea (*Halicore Tabernaculi*, R.). This condition of the heart was first noticed by Daubenton in the *fœtus* of the Manatee; and is also described by the unfortunate Steller in the genus worthily consecrated to his name, in which, however, the apical cleft of the heart extended upwards only one third of the way towards the base. In the Dugong it reaches half-way towards the base. The carnivorous *Cetacea* do not participate with the herbivorous section in this interesting structure.

"In the smoothness and evenness of their exterior, and their general form, the auricles of the Dugong resemble those of the Turtle (*Chelone*): the *appendix* can hardly be said to exist in either. There is one superior *cava* only, not two as in the elephant.

"The peculiar form, structure, and position of the lungs have been so accurately described and figured by Raffles, Home, and Rüppel,

* See *Novi Commentarii Acad. Scient. Petrop. t. ii.* 1751.

† *Beschreibung des im Rothen Meere vorkommenden Dugong.* 4to. Frankfurt, 1833, p. 106.

that I have only to observe the close agreement with these accounts which the structure of the parts presented in the three Dugongs dissected by me; Daubenton* and Humboldt† describe and figure a precisely similar condition of the respiratory apparatus in the Manatee. Steller describes the same extension of the lungs along the dorsal aspect in the *Stellerus*, which he aptly compares to the position of the lungs in the bird, but without their fixation to the *parietes* of the chest, so characteristic of that class. The Chelonian reptiles, perhaps, offer a closer resemblance‡ to the herbivorous *Cetacea* in this respect; and it is worthy of remark that the air-cells of the lungs are larger in the Dugong than in any other Mammals. In the carnivorous *Cetacea* the air-cells are remarkably minute, and the lungs more compactly shaped and lodged in a shorter *thorax*.

"There are but three true tracheal rings anterior to the bifurcation of the air-tube: the first of these is remarkable for its superior size, which forms an intermediate transition between the cricoid and the second tracheal ring. The tube is somewhat flattened from before backwards; its circumference is 5 inches; its antero-posterior diameter 1 inch. In the *Balænidæ* the tracheal rings are deficient at the anterior part of their circumference. The spiral disposition of the cartilages of the air-tubes, of which Home has given a figure, in the Dugong, is described with more detail by Steller in the Northern Manatee. It is a structure which best facilitates the lengthening and shortening of the lungs, whose change of bulk in respiration, owing to their peculiar form and position, probably takes place chiefly in that direction.

"Amongst the true *Cetacea* we have observed that it is those which subsist on the lowest organized animal substance, as the *Balænidæ*, which approach the nearest to the herbivorous species, in having the additional complexity of the *cæcum cœli*; and it is interesting to find that the same affinity is manifested in the structure of the *larynx*. The *epiglottis* and *arytenoid cartilages*, for example, are relatively shorter in the *Balænoptera* than in *Delphinus*; and, as Mr. Hunter has observed, they are connected together by the membranes of the *larynx* only at their base; and not wrapped together or surrounded by that membrane as far as their *apices*, as in the Dolphins. In the *Balænoptera* also, the *apices* of these cartilages are not expanded, as

* Buffon, vol. xiii.

† Wiegmann's *Archiv für Naturgeschichte*, 1838, pl. ii. fig. 5.

‡ This resemblance is further exemplified in the shortness of the *trachea*, the completeness of its cartilaginous rings, the length of the bronchial tubes, and the extension of their cartilaginous structure far into the substance of the lungs in the Dugong.

in the Dolphins, but diminish to an obtuse extremity. These points of resemblance to the condition of the *larynx* in the Dugong and Manatee are carried still further in the Mysticete Whale, at least in the *fœtus* dissected by me, and in which both the *epiglottis* and *arytenoid cartilages* were relatively much shorter, and the thyroid cartilage larger and more convex than in the Piked Whale (*Balænoptera*). The *thyroid cartilage* is, however, a single piece in both genera of *Balænidæ*, though deeply notched above and below; and the *larynx* presents several interesting individual peculiarities, which, however, the minute and accurate descriptions and illustrations of this organ in both the *Balænopteræ* and *Balænæ*, published by Prof. G. Sandifort*, preclude the necessity of further dwelling upon.

"The generative organs being those which are most remotely related to the habits and food of an animal, I have always regarded as affording very clear indications of its true affinities. We are the least likely, in the modifications of these organs, to mistake a merely *adaptive* for an *essential* character. The true *Cetacea*, as is well known, have no trace of *vesiculæ seminales*; but I found these bags present and of large size in the male specimen of our Dugongs.

"The bones are chiefly remarkable, as in the Manatee, for their dense texture, and the non-development of medullary cavities in them: this reptile-like condition of the skeleton is further exemplified in the loose connexion of the bones of the head. The bones are not loaded with oil, as in the *Cetacea*. All the specimens presented 7 cervical and 19 costal *vertebræ*, corresponding to the 19 pairs of ribs; but the number of the remaining *vertebræ* exceeded that ascribed to the Dugong by Home and Cuvier, there being at least 30, making in all 55. The affinity of the Dugong to the *Pachydermata* is thus again illustrated by the great number of the ribs. The lower jaw is articulated to the *cranium* by a true synovial capsule, reflected over cartilaginous surfaces, and not, as in the carnivorous *Cetacea*, by a coarse and oily ligamentous substance.

"It has been suggested that the use of the projecting tusks in the Dugong is to detach *fuci* from the rocks to which they adhere: one can hardly, however, assign any important function in relation to nutrition to parts which are limited to the male sex; but it must be remembered that the function was assigned by a physiologist who supposed that the tusks in question were specific and not sexual characters, and that the imperfect tusks, which are peculiar to the female, were the predecessors of the projecting tusks, and, in fact,

* *Nieuwe Verhandelingen der Koninklik, Niederlandishe Instituut,* Deel. iii. p. 224, pl. I.—V.

deciduous teeth. This opinion of Sir Everard Home was first called in question by Dr. Knox*, who, having detected the supposed deciduous tusks in the head of a nearly full-grown Dugong, rejected with great justice the opinion of Home, that they are deciduous teeth; and he truly observes, that no evidence had been given to prove the existence of deciduous tusks at all in the Dugong†.

"I need hardly observe that the tusks of the Dugong, being implanted in the intermaxillary bones, are to be regarded, like the tusks of the Elephant, as incisors. Now both sexes of the Dugong, as of the Elephant, do, in fact, possess deciduous or milk-tusks, but they are much smaller than the female permanent tusks or supposed deciduous teeth of Home.

"In the skull of a male Dugong which had *molares* $\frac{3-3}{2-3}$, the sockets of the deciduous incisors were obliterated, and the points of the permanent ones projected from their sockets. In only one out of seven *crania* of the Dugong which I have examined, have I found incisors in the lower jaw; they were two in number, one in the corresponding socket of each *ramus*, which sockets were much deeper than the rest. These teeth were smaller and more bent than the deciduous incisors of the upper jaw. They are obviously analogous to the rudimental teeth which have been described in the jaws of the fœtal Whale.

"The short and thick neck, fin-like fore-legs, want of hind-legs, caudal tegumentary fin, smooth, naked, and almost hairless integument, are all modifications of external form, by which the Dugongs and Manatees are adapted to play their part in the waters: but the *kind of part* which they are to play in that element depends on organic characters which mainly if not exclusively reveal their true affinities. Now we have seen that the whole of the internal structure in the herbivorous *Cetacea* differs as widely from that of the carnivorous *Cetacea*, as do their habits: that the amount of variation is as great as well could be in animals of the same class, existing in the same great deep. The junction of the Dugongs and Manatees with the true Whales cannot therefore be admitted in a distribution of animals according to their organization. With much superficial resemblance they have little real or organic resemblance to the Walrus, which exhibits an extreme modification of the am-

* Edinb. Phil. Trans. xi. p. 389.

† "The milk-tusks of the Dugong have never been seen by any one; that is, I have not heard of the existence of any preparation showing the germs of the milk or permanent teeth, together or in succession."—*Dr. Knox, loc. cit.* p. 398.

phibious carnivorous type. I conclude, therefore, that the Dugong and its congeners must either form a group apart, or be joined, as in the classification of M. De Blainville, with the Pachyderms, with which the herbivorous *Cetacea* have the nearest affinities, and to which they seem to have been more immediately linked by the now lost genus *Deinotherium*."

Some prepared specimens belonging to the genera *Siphunculus* and *Asterias*, collected by Mr. Harvey upon the Devonshire coast, and presented to the Society, were upon the table, to which Mr. Owen drew the attention of the Meeting. The Chairman read an extract of a letter from the former gentleman, in which he stated that a considerable number of the Red-band Fish (*Cepola rubescens*) had been picked up on the beach near Teignmouth. One of these specimens sent by Mr. Harvey was exhibited by Mr. Yarrell, who observed that these fish are rarely captured, owing to their keeping very near the bottom, and their shape allowing them to pass through the meshes of the fishermen's nets. In severe storms, however, shoals of this *Cepola* are sometimes killed by being driven against the bottom, or dashed against the rocks, and are then thrown on shore dead. Mr. Yarrell remarked that he had heard of two or three instances of this kind recently occurring on the British coast.

MISCELLANEOUS.

THE NEW HOLLAND GERBOA RAT (*HAPALOTIS ALBIPES*, LICHT.) BY JOHN EDWARD GRAY, F.R.S., &c.

The Trustees of the Museum have recently purchased of Dr. John Lhotsky a perfect specimen of the *Hapalotis albipes*, described by Professor Lichtenstein in 1827, 'Darstellung der Säugethiere,' t. 29, from a specimen sent to Berlin in 1824 by Dr. Sieber; and a second which was sent to Berlin by Dr. Lhotsky was put up for sale there on the 6th of April 1837, and bought by the Royal Museum.

Our specimen differs from that described by Prof. Lichtenstein in having the tail as long as the body, and the tip of it, which was most probably wanting in the Berlin specimen, is covered with long expanding hairs; the upper side of the tail is dark-brown, and the under side and the pencil of long hairs at the tip is white. Dr. Lichtenstein in his description says the tail is only one third the length of the body, but in his figure represents it as half the length of the body and head. The ears of our specimen are covered externally with short appressed hairs, those of the front half being brown, and

the hinder half white. M. Lichtenstein describes them as nearly naked and thin.

The thumbs of the fore feet are furnished with small blunt rudimentary claws; the hair of the back is thickly interspersed with long taper-pointed black hairs.

The cutting teeth are yellow, rounded, and without any grooves in front and shelving at the point within; the grinders are $\frac{3-3}{3-3}$; the crown of the front upper is oblong longitudinal, and furnished with three oblong transverse ridges, and three small rounded tubercles on the inner side; one opposite the inner edge of each of the larger ridges; the second upper has two oblong transverse ridges on the outer side and three small tubercles on the inner; the hinder upper has two oblong transverse ridges extending over the whole width of the tooth behind, and a small row of tubercles at the front inner angle. The front lower grinder is formed of three, rather folded, oblong, transverse ridges, the second and third tooth are each formed of only two similar ridges, the ridges of the hinder tooth and especially the hinder ridge being the smallest.

This description nearly agrees with that given by Lichtenstein, but he supposes that one of the inner rounded tubercles of the upper middle tooth belongs to the anterior one. Notwithstanding these discrepancies between the description of the Berlin animal and the one in our collection, I have no doubt that they are intended for the same species, especially as Dr. Lhotsky informs me that the one we have purchased is similar to that he sent to Berlin, which was named *Hapalotis albipes* by Lichtenstein himself in the sale catalogue p. v. lot 3.

There is a specimen called a native rabbit in Mr. Caley's collection in the Museum of the Linnæan Society, which exactly agrees with our animal in all particulars, except that its ears are naked and semitransparent as they are described by Professor Lichtenstein; but from their appearance I am inclined to believe that they have been accidentally denuded, which is very probable, as the scarf skin on the ears of our specimen appears to be very easily deciduous. The specimen in the Linnæan Society's collection has been recently described by Mr. Ogilby under the name of *Conilurus constructor*, Linn. Trans. xviii. 125, where that gentleman has given an interesting account of its habits, extracted from the notes of Major Mitchell. The general appearance of the animal so much resembles a *Gerboa*, that if it were not for the great difference in size given in Major Mitchell's sketch, I should be inclined to believe that it is the animal which this enterprising traveller has figured in his work as a species of

that genus. This animal is interesting as being the third genus of true Glirine mammals found on the Australian continent, viz. *Hydromys, Hapalotis,* and *Pseudomys.* Indeed the number of non-marsupial mammalia appears to be rapidly increasing as we become better acquainted with the animals of Australia. Thus I now know of three species of insectivorous bats inhabiting that continent, one belonging to a peculiar genus *Nyctophilus,* and two to *Molossus.*

NEW ANOMALOUS REPTILE.

Dr. John Natterer, the industrious collector, who has lately returned to Vienna from South America with his large collections, has published in the 'Annals of the Vienna Museum' (ii. p. 167.) under the name of *Lepidosiren paradoxa,* a new anomalous reptile, which has much the appearance of an eel, but is covered with large netted scales, and the body is furnished with four simple elongated tapering legs; the front pair being placed on the back edge of the upper part of the spiracles, and the hinder pair on the under side of the hinder part of the body. The jaws are furnished with strong truncated teeth, and the vent, which is circular and plaited, is placed on the left of the centre of the under side of the body, just behind the base of the left hind leg. It was discovered in the Brazils near the river Amazon, and grows to three feet. They had two specimens in the Vienna Museum; one of them has been put into the hands of Professor Th. Bischoff for the purpose of being dissected.—J. E. Gray.

ON THE FUR SEAL OF COMMERCE.

In one of your last numbers there is an interesting paper, by Mr. Hamilton, on the fur seal of commerce, illustrated by a figure, which the author supposes will "enable any one at once to recognise the animal." Unfortunately, this is not the case, as from the want of details of the teeth, of a more minute description of the whiskers, ears, and various other parts which form the specific characters of these very intricate animals, we gain nothing from the paper but that the fur-seal is an *Otaria* or Eared Seal, for the colour can scarcely be considered of any importance when we know the great changes it undergoes during growth in the other species of the genus. I am induced to make these remarks in the hope of inducing Mr. Hamilton to extend his description, as I am very desirous of ascertaining if his seal is the same as that which I described some time ago in the 'Magazine of Natural History' (1837), under the name *Leptonyx Wedellii,* from two specimens which were collected by the Hon. Capt. Fitzroy, and by him presented to the British Museum.—J. E. Gray,

HABITS OF SNAILS OR BLACK SLUGS (*ARION ATER.*).

Several instances have been adduced of the land *Helices* eating meat and other extraordinary substances, and I have often observed the garden snails (*Helix aspersa*) eating the paper of the posting bills from the walls of the environs of London after a shower, but I was not aware until the other day, when I was near Newcastle, that they would eat inorganic matter. But having met with a black slug, (*Arion ater,*) and for safety placed it in a box with some sea-sand, just taken from the sea for the purpose of examining the fragments of animal matter which renders it luminous when trodden on in the dark, I was surprised on opening it to observe that the slug had been eating the sand, until its fæces, which were first of a green vegetable colour, were entirely composed of pure sand, united together into their usual form by a little mucus. When first the slug was placed in the box, the irritation of the salt caused it to emit a quantity of mucus, but it very shortly became reconciled to its abode, and lived in it for several days, though the box was open; but at length escaped.—J. E. Gray.

REGULUS MODESTUS, GOULD, A BRITISH BIRD.

I beg to hand you a notice of a very scarce and interesting species of *Regulus*, which I shot on the banks near Hartley, on the coast of Northumberland, on the 26th of last September; it corresponds exactly with Gould's *Regulus modestus*, a species so extremely rare, that he considers the individual from which he described as unique in the continental collections. The description of my bird, which will now entitle this species to a place in the British Fauna, is as follows:

Length, $4\frac{1}{16}$ in.; breadth, $6\frac{1}{2}$ in.; length from the carpus to the end of the wing, $2\frac{1}{16}$ in.; tail, $1\frac{1}{16}$ in.; the bill from the gape to the tip nearly $\frac{7}{16}$ in., and from the tips of the feathers, which extend to the extremity of the nostrils, $\frac{1}{4}$ in.

The whole of the upper plumage a greenish yellow; on the centre of the crown of the head is a streak of paler; a light lemon-coloured streak extends over the eye from the base of the bill to the occiput; a short streak of the same colour passes beneath the eye, and a narrow band of dusky passes through the eye and reaches the termination of the auriculars. The under parts pale yellow; the ridge of the wing bright lemon colour; wing feathers dusky, edged with pale yellow, becoming broader on the secondaries; two conspicuous bands of lemon colour cross the coverts; the wings reach to within $\frac{3}{4}$ in. of

the end of the tail. Bill brown, with the under mandible paler at the base; mouth yellow; legs and toes brown with the under surface of the toes inclining to yellow; claws brown. Its manners, as far as I had an opportunity of observing them, were so like those of the golden-crested wren, that at first I mistook it for that species. It was continually in motion, flitting from place to place in search of insects on umbelliferous plants, and such other herbage as the bleak banks of the Northumberland coast affords: such a situation could not be at all suited to the habits of this species, and there can be little doubt that it had arrived at the coast previous to or immediately after its autumnal migrations.—J. Hancock, *Newcastle-on-Tyne.*

Note.—When Mr. Gould's figure appeared in the 'Birds of Europe,' we expressed an opinion that this might only prove a young bird of some of the other species, and we rejoice that an opportunity has now occurred of clearing this doubt. Mr. Hancock has stated to Mr. Selby that the covering of the nostrils in his specimen consists of various feathers and not of a single plumulet as in the other *Reguli*: this will afford a distinguishing mark, and will moreover destroy the importance of the structure as a generic character. We would recommend, however, that the nestling or first plumage of the *Regulus aurocapillus* and *ignicapillus* should still be examined. —Edit.

METEOROLOGICAL OBSERVATIONS FOR OCTOBER 1838.

Chiswick.—Oct. 1. Hazy. 2. Cloudy: fine. 3. Fine. 4. Very fine. 5. Hazy: fine. 6, 7. Overcast. 8, 9. Bleak and cold. 10. Cloudy. 11. Cloudy and fine. 12. Clear and cold: slight snow. 13. Clear: showery: frosty at night. 14. Overcast: showery: frosty at night. 15, 16. Cloudy. 17, 18. Fine. 19. Overcast: clear and fine. 20. Rain: overcast. 21—24. Cloudy and fine. 25. Foggy: clear at night. 26. Fine. 27. Cloudy: stormy and wet at night. 28. Hazy: heavy rain: violent hurricane from s.w. during the night. 29. Clear and windy. 30. Fine. 31. Heavy rain.

Boston.—Oct. 1. Cloudy. 2, 3. Fine. 4. Cloudy. 5. Fine. 6, 7. Cloudy. 8. Cloudy: rain p.m. 9—11. Cloudy. 12. Stormy: snow p.m. 13. Fine: ice this morning one eighth of an inch thick. 14. Cloudy: rain p.m. 15. Cloudy. 16. Cloudy: stormy p.m. 17, 18. Fine: stormy p.m. 19—21. Fine. 22, 23. Cloudy. 24. Cloudy: rain early a.m. 25. Cloudy. 26. Cloudy: rain early a.m. 27. Fine: stormy with rain p.m. 28. Fine: rain p.m. 29. Stormy: rain early am. 30. Fine. 31. Cloudy.

Applegarth Manse, Dumfries-shire.—Oct. 1, 2. Fine harvest days. 3. Ditto, but cloudy: frosty p.m. 4. 5. Very warm: frost rime. 6. Warm: not a breath of wind. 7. Mild day, but cloudy. 8. Fine harvest day. 9. Ditto, but threatening rain. 10. Still lowering and threatening rain. 11. High wind: slight shower. 12. Dry and cold. 13. Ditto: snow showers passing. 14. Wet all day. 15. Moist and stormy. 16. Wet all day. 17. Drying day. 18. Wet all day. 19. Drying again. 20. Clear and drying. 21, 22. Moist: showers p.m. 23. Fair a.m.: came on rain. 24. Showery. 25. Very wet p.m. 26. Rivers in flood: drying p.m. 27. Showery all day: flood again. 28. Hoar frost a.m.: fine p.m. 29. Partial showers. 30. Fine day: slight rains. 31. Fair: wet afternoon.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. Roberton; *by* Mr. Thompson *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. Veall *at Boston, and by* Mr. Dunbar *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1838. Oct.	Barometer.						Thermometer.								Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London; Roy. Soc.			Chiswick.		Boston. 8¼ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick. 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	9 p.m.	Fahr. 9 a.m.	Self-register. Max.	Self-register. Min.	Max.	Min.		9a.m.	9p.m									
1.	30·338	30·357	30·318	29·83	30·42	30·44	51·8	60·6	52·6	59	51	53·5	54	49½	NW.	N.	E.	N.	...	·01	...	...	52
2.	30·356	30·457	30·348	29·90	30·52	30·58	55·4	57·6	52·2	63	47	58	52	48	N.	N.	E.	NE.	...	...	...	...	52
○ 3.	30·428	30·444	30·406	30·	30·57	30·50	55·7	60·4	47·8	64	42	55·5	48½	44	NE.	NE.	E.	NE.	...	...	...	...	50
4.	30·394	30·395	30·376	29·93	30·43	30·40	51·0	61·2	53·2	61	37	51	40	42	N.	NE.	calm	NE.	...	...	...	...	48
5.	30·352	30·406	30·338	29·90	30·37	30·37	49·7	58·8	46·6	59	46	49	40	44	N.	E.	calm	E.	...	...	...	0·02	48
6.	30·372	30·410	30·379	29·92	30·37	30·41	49·8	56·6	46·9	56	49	47	39½	50	NNE.	NE.	NE.	NW.	...	...	...	...	45
7.	30·372	30·385	30·343	29·93	30·40	30·33	51·4	54·5	49·2	56	47	52	49	46½	NNW.	NE.	calm	W.	...	...	...	...	47
8.	30·352	30·412	30·351	29·92	30·38	30·38	52·0	54·9	48·8	56	47	48	50½	42	NW.	NE.	calm	N--S.	...	...	...	...	47
9.	30·360	30·367	30·306	29·89	30·33	30·23	52·4	55·7	49·0	56	47	50	50	50	NW.	NE.	calm	NE.	...	...	·07	...	48
☾ 10.	30·230	30·234	30·159	29·74	30·10	30·00	51·3	57·6	50·0	57	48	49	52½	46	WNW.	NW.	calm	NW.	...	...	...	...	47
11.	29·996	30·100	29·859	29·47	29·75	29·39	52·8	54·3	49·9	60	49	52	50	42	SSW.	SW.	calm	SW.	...	...	...	...	48
12.	29·652	29·758	29·657	29·21	29·59	29·64	46·2	59·7	42·8	47	42	45	40	34	W.	NW.	N.	NW.	...	·02	...	0·30	44
13.	29·762	29·975	29·806	29·40	29·78	29·82	39·4	50·3	36·4	44	28	36·5	34	38	W.	NW.	N.	N.	...	·02	...	...	39
14.	29·904	29·929	29·497	29·44	29·55	29·28	41·4	45·0	32·8	49	26	41	44	48	S.	SW.	N.	W.	...	·20	...	...	38
15.	29·574	29·656	29·616	29·08	29·36	29·30	51·8	53·8	40·4	56	47	51	50	52½	W.	W.	NW.	W.	·075	...	·27	...	43
16.	29·614	29·684	29·442	29·04	29·29	29·04	55·7	59·7	48·8	60	51	56	54	52	SW. var.	SW.	NW.	W.	...	...	...	...	48
17.	29·292	29·548	29·293	28·76	29·02	29·49	54·5	61·0	53·5	55	37	54	47½	49½	S.	W.	NW.	W.	·125	...	...	...	50
● 18.	30·054	30·013	29·861	29·55	29·77	29·39	46·2	59·3	42·0	54	42	45	42	48	SW. var.	SW.	NW.	W.	...	...	...	...	41
19.	29·910	30·073	29·833	29·42	29·74	29·80	57·8	58·4	46·2	62	45	52	48	48	SW. var.	NW.	NW.	WNW	·033	...	...	1·12	50
20.	30·088	30·199	29·923	29·50	29·82	30·04	57·8	59·3	54·0	66	41	58	52	48	SW.	W.	W.	NW.	...	·02	...	...	51
21.	30·296	30·250	29·981	29·64	30·03	30·03	55·8	63·5	48·4	64	54	55·5	52½	52	S.	SW.	calm	SW.	...	...	...	...	52
22.	30·156	30·116	30·043	29·59	29·91	29·86	57·4	61·2	55·7	61	53	57	54	52½	SE.	S.	calm	SW.	...	...	...	...	52
23.	29·960	29·924	29·765	29·42	29·70	29·51	56·7	61·0	54·8	57	52	55	54½	52	S.	S.	calm	SW.	...	...	...	...	53
24.	29·740	29·928	29·742	29·21	29·50	29·85	55·0	58·6	53·7	63	39	55	50½	48	S.	W.	calm	SE.	·083	...	·05	...	52
25.	30·118	30·056	29·947	29·20	29·90	29·50	50·7	59·9	46·0	58	48	57	46	50½	SW.	SE.	W.	SW.	·013	...	...	...	50
☽ 26.	29·780	29·925	29·795	29·19	29·43	29·74	57·3	58·2	49·0	62	30	57	50½	42	SW.	W.	W.	S.	...	...	·04	...	52
27.	29·922	29·890	29·755	29·45	29·43	29·33	49·7	59·3	41·3	57	47	42·5	49½	46	S.	SW.	W.	SW.	...	·80	...	2·90	47
28.	29·598	29·617	29·404	29·10	29·43	29·32	51·6	56·6	41·2	59	45	48	39	42	W.	SW.	calm	S.	·488	·49	·36	...	48
29.	29·356	29·722	29·280	28·75	29·16	29·38	49·2	57·2	43·7	54	36	45·5	42	40½	SW. var.	SW.	NW.	W.	·330	...	·56	...	47
30.	29·746	29·774	29·746	29·30	29·47	29·61	46·3	52·7	40·0	56	40	43	42	36	E.	SW.	calm	W.	...	·50	...	...	44
31.	29·824	29·846	29·759	29·46	29·72	29·47	43·3	52·0	40·0	53	32	41	34	42	N.	NE.	calm	W.	·213	·30	...	...	
Mean.	29·993	30·066	29·913	29·48	29·85	29·83	51·5	54·7	47·0	54·32	43·32	50·3	47	46					Sum. 1·360	2·36	1·35	4·34	Mean. 47·6

ANNALS OF NATURAL HISTORY.

XXXV.—*On the Writings of Goethe relative to Natural History.* By M. F. G. Pictet*.

The labours of Goethe in natural history had for their object comparative anatomy, botany, and geology. All bear the stamp of the loftiness of conception and profoundness of view which are characteristic of genius; they treat of the most important, but also sometimes of the most disputed points of organization; we would therefore confine ourselves to the part which we can best appreciate, and chiefly point out the services he has rendered to comparative anatomy. But previously, and in order to explain how and to what extent Goethe was an anatomist, it is indispensable to take a slight view of his life and the epoch of his labours.

Born and reared at Frankfort on the Maine, Goethe directed his first studies, as he himself tells us, to the knowledge of ancient and modern languages. His literary taste displayed itself early, and some poetical essays completed these first labours. No circumstance had ever as yet led him to study nature, and at most a vague desire of acquiring a knowledge of her laws now and then crossed his mind. "Here and there in my poetical essays," says he in the sketch which in 1831 he gave of his botanical studies, "are to be perceived some traces of a passionate love for the country, and of an earnest desire to penetrate the great secret of the constant creation and annihilation of beings; but this desire evaporated in vain and useless contemplations."

It was at Strasbourg, in 1770, that he first set about the study of the natural sciences. Having come to this city to take the degree of doctor of laws, he gave to this pursuit so much time only as was strictly necessary, and followed with ardour courses of chemistry, anatomy, medicine, and even of

* Translated from the Bibliothèque Universelle de Genève, vol. xv. p. 338.

midwifery. He returned to Germany with a very decided taste for these sciences, a taste which his abode at Weimar still continued to cherish. Living much in the country in the midst of a society of learned men, making frequent botanical excursions, and availing himself of every opportunity of improving and exercising his talent for observation, he made himself acquainted with the principal phænomena of vegetation, and from this epoch is to be dated the origination of his principal ideas of botanical organography.

He describes himself afterwards as working at Jena with ardour at the collections of comparative anatomy, the importance of which for instruction was more and more felt; the collections of that city still contain several preparations from his hands. By this means he acquired an exact and detailed knowledge of animal forms, and laid up for himself important materials for his subsequent labours. "I sawed," said he, "and cleaved bones and sculls in every direction, in order to obtain foreseen or unforeseen lights on the structure of bones." And indeed osteology was the department of zoology with which afterwards he was principally occupied. At this period he became the rival and friend of the anatomist Loder, and from that time he hardly ever ceased working at comparative anatomy, either to learn what had been done before him, or to extend the boundaries of the science and suggest improved methods. Fourteen memoirs or notices, composed from 1786 to 1832, bear witness to his continued interest for this study. His memoirs, however, did not always meet with an encouraging reception. Thus, when he had drawn up an account of his discovery of the intermaxillary bone in man, he sent it to Camper, who praised him for the composition, gave him advice about the drawings, but did not admit the results. Blumenbach also refused to admit its truth. In spite of the formidable disapprobation of two of the most celebrated anatomists of Germany, Goethe was not discouraged; but it was not till forty years afterwards that his ideas on the intermaxillary bone were adopted by all naturalists. This is unfortunately the history of most of the discoveries which swerve from the track of generally received ideas.

Goethe was very tenacious of his reputation as a naturalist,

and was particularly desirous that the results to which he had come should not be attributed to a brilliant imagination, but that they should be regarded as the fruits of long and earnest labours. He concludes the history of his botanical studies with these words: "For half a century and more I have been known as a poet in my own country and even to foreigners, and no one dreams of denying me this talent. But what is not so generally known, what has not been sufficiently taken into consideration, is that I have worked earnestly and for a long time at the physical and physiological phænomena of nature, that I have observed in silence with the perseverance which devotion alone can give. Also when my Essay on the knowledge of the Laws of development of the Plant, printed in German forty years ago, excited attention, first in Switzerland, then in France, people knew not how to express their astonishment, that a poet, usually occupied with intellectual phænomena, which are from the fountain of sentiment and imagination, turning an instant from his course, had by the way made so important a discovery. It is to controvert this mistaken notion that this preface has been written. It is intended to show that I have devoted a great part of my life to the study of natural history, to which I was drawn by a passionate taste. It was not by the sudden and unexpected inspiration of a genius endowed with extraordinary faculties, it was by continued studies, that I arrived at this result."

Thus then we may look upon Goethe as a true naturalist, who, if he had not had so great a reputation as a poet, would long since have been quoted amongst the men of science, for whom Germany is illustrious. He advanced science, and well understood its requirements. He studied with ardour the facts upon which it rests, and, as he himself tells us, he arrived at general laws by a comparison of details. Assuredly we do not wish to deny the share which the strength of his imagination may have had; this noble gift has in general been the endowment of all those who have advanced science by new conceptions and felicitous theories. But we no longer live in an age, when theories, which are but the produce of this faculty, brilliant as it may be, can be regarded as a progress. The imagination is to be admitted only when it generalizes facts,

when it deduces consequences from them, and by these means throws a vivid light upon a subject which without its aid would have remained inert and obscure. It was this species of imagination that directed the labours of Goethe. It is the glory inherent in its results that he lays claim to; a glory which we shall justify by an inquiry into the services which he has rendered this science, and into the manner in which he has viewed some of the important questions which have been debated in these latter years.

It was natural for Goethe, a German and a poet, to set out from the principle of the unity of organic composition in its widest acceptation; and in fact, the greater part of his labours were directed to the demonstration of this law, which tends every day more and more to become the basis of comparative anatomy. In this respect he preceded all the naturalists of his age; he has indeed been outstripped since, and some German anatomists have gone much further in this path, at that time new. Time will show whether they have proceeded in it with as much success. Goethe quickly perceived that anatomical determinations were tainted with a diversity opposed to the progress of the science; he felt that a rallying point was wanting for these conclusions, that they must be uniform in all animals, and that, without this principle, confusion and the want of a rule must necessarily make the study of comparative anatomy difficult and even impossible. He was not slow in observing that this rallying point was the principle of unity of organic composition, and that the discovery of this law must alter the face of the science, by giving it for a basis the unity which reigns in nature. It was he, it seems, who if he did not catch the first glimpse, at least, who first clearly comprehended this important fact. But he did not immediately publish his ideas upon this subject, so that the constant progress of science led to its being discovered in the interval, in France, by Geoffroy St. Hilaire. The regeneration of comparative anatomy set out then at the same time from these two countries; and if these discoveries have brought on such animated debates, we should, I think, only attribute them to the too great promptitude which the innovators have been desirous of displaying, for the principle of unity of or-

ganic composition can no longer be denied within certain limits: the labours of those even who have opposed it when it was put forth in all its generality, are grounded upon this principle in a more confined view. All discussion at the present day can have for its object only the fixing these limits, and we do not think that the state of the science will admit of this being done with any security.

Setting out from these principles, the illustrious author, of whose works we are giving an analysis, published some memoirs which may be referred to two classes. The first relates to the method which should serve as a guide in the researches of comparative anatomy. The second is the discovery of some particular facts having a relation to the demonstration of the principle. In the first class we shall principally quote the memoir entitled, *On the necessity of the establishment of a Type in order to facilitate the study of Comparative Anatomy.* The ancient method, which consists in comparing man with animals and these with one another, is lengthy, destitute of fixed principles, and has only led to incomplete results. It is necessary with regard to each species to note the differences and resemblances to others; and although the natural methods have greatly facilitated these comparisons by diminishing the number of beings to compare, still one may say with Goethe, that comparative anatomy, viewed in this manner, is "a work impossible, infinite, which, if by a miracle it should one day be accomplished, would be without results as without limits."

The notion of an ideal type, created, by abstraction, from the assemblage of the parts common to all animals, supposes a philosophical survey of organization as a whole, puts in evidence, at the outset, the prominent points, allows all descriptions to be reduced to the comparison of the species to the type, by this very means makes it possible to compare all these descriptions with one another, and thus the labour becomes easier and more philosophical. The possibility of creating this type flows from the law of unity of organic composition; and the idea of the type is nothing else than the perfect conception of this law; for if we suppose the organs analogous and similarly arranged, this state and this arrangement in common, considered as an abstraction made from individual forms

and variations, naturally constitute the type, which accordingly cannot be confounded with any species more than the whole can be confounded with a part.

It may be conceived how much such a method is preferable to that, so frequently employed, of taking man as a type, when his very perfection makes him, in most cases, very unfit for this purpose.

The creation of the type necessarily varies according to the objects of comparison. If we wish to study a particular class, the type may be more defined, the characters in common being more numerous. The type the most difficult to establish will be the animal type, for to seize it perfectly, it will be necessary to have a perfect idea of the parts common to all animals, or in other words, to have exhausted the study of analogies. Thus the establishment of types will be a feeling our way, and the perfect type the result of the science at its zenith, as the imperfect type will be the amount of this science at some certain period, and the basis upon which it will lean in order to continue its progress.

The type being once created, Goethe applies himself to its comparison with individual forms, and, in this analysis, sets out from the principle that diversity has no other origin than this; that, in the development, one part becomes predominant at the expense of some other, and *vice versâ*. He admits with respect hereto the influence of surrounding media and of exterior causes generally, by the force of which the nutritive matter is directed in superabundance and under certain forms to particular parts, so as to produce there a hypertrophy, always followed by an atrophy in some other part of the same being, because the nutritive matter is diverted from it to the gain of the former. He supposes that a certain formative or *plastic* force is given to every being, and that if it be directed to one point the consequence must necessarily be inverse modifications with regard to the others*. "The general total," says he, "in the

* To make this idea intelligible to those who are little accustomed to these theories, I shall cite the instance of the reptiles, in which we see the plastic force sometimes direct itself upon the vertebræ, sometimes upon the feet. Starting from the lizard, as a mean point, we come on one side to the frog, in which the feet, by an excessive development, subject the ribs to atrophy; and on the other side we find the serpent, in which the develop-

budget of nature is fixed; but she is free to dispose of particular sums by any appropriation that may please her. In order to spend on one side, she is forced to œconomize on the other, and nature can therefore never run in debt nor become bankrupt." It is easy here to recognise the principle put forth by M. Geoffroy Saint Hilaire under the name of the *balance of organs.*

These considerations may be applied in two ways; either in the comparing of beings with one another, and the result of this observation is to show the general type modified by the above law according to the part which the species acts in nature and the medium in which it dwells; or in comparing with each other the different parts of the same being, a study in which the same balance is perceived, and which leads to generalizations of a more difficult character and included generally under the name of *the law of homology.* We shall here leave these discussions concerning the type, and shall not follow the author in the applications he makes of them when he produces the model of an osteological type for the Mammiferæ, and analyses the variations of the bones and the characters by which they may be known; an analysis of high importance from its applications, but which would carry us beyond our intended limits.

Under the second head, that of special labours, we always discover the same drift and the same philosophical views. One of the most generally known is the discovery of the *intermaxillary bone* in man. It is known that most of the Mammiferæ have both sides of the upper jaw formed of two bones, the one external and largest, which contains the molary and canine teeth, and which is the *maxillary* properly so called; the other internal, smaller, which contains the incisors, and which has received the name of the *incisive* or *intermaxillary* bone. These two bones are not separate in man at the adult age.

The naturalists of the past century had eagerly laid hold of

ment of the ribs brings with it the disappearance of the feet. This latter example has even this remarkable circumstance, that all the transitions are to be seen, at first in the *Scincidæ*, which have more ribs than the lizards and smaller feet; then in the *Sepsidæ*, which have almost the ribs of serpents and the rudiments of feet; and lastly in *Anguis*, which comes still nearer to the serpents, and whose limbs are not externally visible.

this fact as tending to establish that man and the animals have not a common structure. Feeling what an immense distance separates man from the rest of the creation, they sought with care for all the differences of organization by which this distance could be increased; not perceiving that these details of structure are nothing in comparison with differences of a higher order, which alone can establish an impassable barrier. Goethe understood and demonstrated that in this particular, as in others, the organic materials which constitute the body of man are the same as those which compose that of animals. He proved that man, at every age, shows traces of the bipartiteness of the bones of the jaw, and that it is possible by certain criteria to find, in the adult, in a portion of the maxillary, the true incisive bone of the Mammiferæ. He confirmed this view of the matter by proving that in the child at its birth the two bones are separate and distinct, and that the only difference that can be pointed out in regard to this is, that in man they are consolidated very early by the operation of life, whilst in the greater part of the Mammiferæ they unite late, and in some not at all. This discovery of Goethe, although bearing upon a detail which may appear minute, has been of importance, inasmuch as his inquiry was one of the first conceived in this spirit of establishing analogies, an idea which has been so fertile in beautiful results. We have said already how long a time was necessary for the adoption of this opinion.

The principle of the head being composed of vertebræ, that remarkable application of the law of homology, had also struck Goethe before the time when first it was submitted to the examination of anatomists; but he did not publish his ideas respecting it, and consequently he cannot be considered as its author. We know that the bones of the skull, formerly considered as special formations, have subsequently to the beginning of this century been viewed in a different light by some naturalists. As the brain is the prolongation of the spinal marrow, so the skull is, according to these anatomists, the prolongation of the spinal column. The brain differs from the spinal marrow by its expansion; the skull differs from the vertebræ by a greater development of the superposed laminæ

of the nervous system. In accordance with these considerations the skull has been decomposed into three vertebræ, and the face into three others, placed relatively to each other like the vertebræ of the body, but much more developed in the parts which envelop the brain, because this organ is much more developed than the spinal marrow. Thus these bones are no longer a special formation, but a repetition of the preceding formations.

M. Martius relates, in one of the notes which he has added to his translation, that the poet, as he walked in the cemetery of the Jews at Lido, near Venice, picked up on the sand the head of a ram, the skull of which was split longitudinally, and that whilst looking at it the idea instantly struck him that the face was composed of vertebræ; the transition from the anterior sphenoide to the ethmoide seemed evident to him at the first glance. This was in 1791, and at this time he did not make known his idea. Sixteen years later it was laid down by Oken that the head was composed of six vertebræ. According to Carus, this discovery may have been the result of an inspiration altogether resembling in its circumstances that of Goethe. Being in one of the ancient forests of the Brocken, Oken saw at his feet a stag's head perfectly bleached; he picked it up, turned it, examined it, and cried out, "'Tis a vertebral column!" M. Dumeril at the same time in France, from considerations entirely different, announced to the Institute the analogy of the head and the vertebræ,—an idea which was at this period received with astonishment and even with disapprobation.

We may moreover notice among the special labours of Goethe, his observations on the researches of Dr. Jægger upon the subject of the fossil bulls found in the neighbourhood of Stuttgard. Goethe seeks to prove in this article, that the differences which exist between fossil and recent bulls may be looked upon as the result of the perfecting of the species during the centuries which separate the two periods. His argument affords interest; but it seems to us that the poet plays almost as leading a part in it as the naturalist.

Goethe took great interest in the famous discussion raised in 1830 in the Academy of Sciences of Paris, upon the prin-

ciple which we have stated above. Every one remembers, that in these debates, perhaps the most remarkable that ever took place in a learned assembly upon a question relating to natural history, M. Cuvier, strong in his power of observation, his immense labours, and the rigour of his zoological method, denied to the unity of organic composition the right of being erected into a general law. He acknowledged it within certain limits, but would not admit of any other analogies than those which were rigorously demonstrated, and rejected all generalization conceived *a priori* and not yet proved by facts. M. Geoffroy St. Hilaire on his part, also attended by a numerous train of remarkable labours and important researches, gave himself up to his fancy, to predetermine the general laws of organization, which he conceived were revealed to him by those which are known. He required that the unity of organic composition should be recognised *a priori*, leaving to the progress of the science the business of demonstrating it in its details in succeeding ages. We have said enough to show that Goethe, with almost the entire body of German philosophers, rendering justice to the science and talents of the two illustrious champions, were sharers in Geoffroy's views of the subject. He has given his countrymen a history of this great struggle between analysis and synthesis; for he felt that it was a European question, and that it was agitated for Germany as well as for France. These two countries, ordained to march at the head of comparative anatomy* had till then but little understood each other, and Goethe saw well that this discussion was the beginning of a new æra, in which the synthetical ideas of the Germans would be more and more appreciated in France. The school at the head of which Geoffroy St. Hilaire placed himself was destined to bring about this union, in which the development of the science is so deeply interested. Goethe was happy in seeing this school appreciate the valuable labours of his countrymen and himself, and with the memoirs of this change his literary course terminated. The analysis of which we speak is the last work which came from the pen of this great writer.

* "Faits pour marcher à la tête," so says our author.—Transl.

XXXVI.—*Notes on some Shrews brought from Germany by W. Ogilby, Esq., including the description of an apparently New Species.* By the Rev. Leonard Jenyns, M.A., F.L.S., &c.

Mr. Ogilby, on his return from Germany in the autumn of 1837, brought with him a small collection of shrews, which had been all obtained in the neighbourhood of Francfort-upon-Mayne. These he very obligingly submitted to my inspection, allowing me to compare them with our British species, and to describe any amongst them which might appear new. The collection consists of fourteen individuals, referrible to at least five distinct species, one of which is either undescribed, or not described with sufficient accuracy to be recognised. It has appeared to me that it would be advantageous to science to publish the characters of this new species, as well as any notes relating to the others which might serve to make them better known to the naturalists of this country. I shall take them in the order in which they arrange themselves according to Duvernoy's views adverted to in my former memoirs, premising only, that all the specimens, with the exception of two or three duplicates which I was kindly permitted to retain, have been deposited in the museum of the Zoological Society.

I. Sorex, *Duv.*

(1.) *S. Araneus*, Geoff.—The dentition of this species furnishes the type of Duvernoy's first subdivision of the genus *Sorex*. That of the specimen examined accords accurately with the description of that author, excepting that the upper middle incisors are not in contact at their extremities. The snout is of the same form as that of the *S. tetragonurus* of this country, and attenuated to about the same degree; but it is more decidedly emarginate at the tip between the nostrils. It is also somewhat broader between the eyes, in consequence of their being placed further back than in the species last mentioned. The distance between the eyes is contained very nearly, but not quite, twice in the distance from the eye to the end of the snout. The ears are much more developed and stand more out of the fur than in any of the British shrews,

and the same character may be observed in all the species belonging to this section. The feet are of moderate size, of about the same length as in the *S. tetragonurus,* but not altogether so strong; the claws especially are shorter and weaker, and apparently not so well calculated for digging. The disposition of the tubercles, which varies but little in the species of this genus, is also similar; but the tubercles themselves are larger, those in particular beneath the last phalanges of the toes on the fore feet. The tail is of about the same length, but of a very different form, being nearly round or free from angles, and decidedly stouter at the root than at the tip, towards which it gradually tapers. It is also furnished with long conspicuous whitish hairs*, scattered here and there among the other shorter ones. There is little or no pencil at the extremity, but possibly it may have been worn from age. The colour of the upper parts and sides of the body is brown tinged with reddish, that of the under parts yellowish grey: the lips and feet appear to have been flesh-colour.

Dimensions.

	In.	Lin.
Length of the head and body	2	9½
——— of the tail	1	6
——— of the hind foot (from the heel to the extremity of the claws)	0	6
——— of the fore foot (from the wrist in like manner)	0	4
——— of the ears (measured from behind)	0	2
From ear to eye	0	2¾
——— to the end of the snout	0	8¾

There is a second specimen in the collection which appears referrible to the above species, but which nevertheless differs in a few particulars. The snout is longer, especially that portion of it between the ear and the eye. The tail is shorter, and not quite so stout at the base, though still tapering at the tip: the long scattered hairs are not quite so numerous. The dentition, feet, and colours are similar. The entire length of this specimen is 2 inches 7½ lines. The length of the tail 1 inch 3¼ lines.

* Mr. Waterhouse first drew my attention to these long interspersed hairs, which appear to be found in all the species belonging to Duvernoy's first section.

(2.) *S. Leucodon*, Herm.—The collection contains two adult and four immature individuals of this species. In the adult the upper middle incisors are rather less curved than those of the *S. Araneus* last described, and with the spur behind less developed. They are quite separate throughout their whole length in one of the specimens, but in contact at their tips in the other. The second and third lateral incisors above are also smaller in relation to the first. The lower middle incisors are long and slightly recurved. The snout is of the same form as in the last species, but its proportions a little different, the distance from the ear to the eye being one-third less. This is in consequence of the upper margin of the auricle being brought rather more forward. The head does not appear so full or large, the crown between the ears being more depressed. The feet are similar, but the tubercles on the soles somewhat smaller. The tail is shorter, and less tapering at the extremity; the long scattered hairs more numerous. The colours are considerably darker above and paler beneath; that of the upper parts is very deep reddish brown, that of the under pure silvery grey; the two are separated on the sides by a tolerably well-marked line.

In the young individuals of this species the teeth are not all apparent, the lateral incisors being still invested with the skin of the periosteum. The middle incisors are much shorter than in the adult *. The snout also is more obtuse, and in three of the specimens the distance from the ear to the eye is relatively greater. In the fourth, however, the proportion of this part is the same as in the adult, showing that too great stress must not be laid upon this character. The colours are exactly similar.

Dimensions of the two adult specimens.

	(1.) In.	(1.) Lin.	(2.) In.	(2.) Lin.
Length of the head and body	3	0	2	9
——— of the tail	1	2	1	3½
——— of the hind foot	0	6	0	5½
——— of the fore foot	0	4	0	4
——— of the ears	0	1½		
From ear to eye	0	2	0	1¾
——— to the end of the snout	0	8	0	7¼

* I have already noticed the peculiarities of the teeth in these young specimens in a former memoir. See Ann. of Nat. Hist., vol. i. p. 427.

The length of the young specimens, exclusive of the tail, varies from 2 inches 4 lines to 2 inches 7 lines.

Duvernoy at one time seems to have entertained a doubt as to this species being distinct from the *S. Araneus,* but in my opinion there cannot be a question about it.

II. Amphisorex, *Duv.*

(3.) *S. tetragonurus,* Herm.—Two specimens in the collection, to one of which I found the name of *tetragonurus* attached, accord so exactly with the square-tailed shrew of this country, described in a former paper (Ann. Nat. Hist., vol. ii. p. 43), as to leave not a doubt in my mind of their identity, or of our English species being the true *tetragonurus* of the continent. In fact there is not the slightest difference in any one of their characters. The larger of the specimens measures 2 inches 11 lines, with a tail of 1 inch 5½ lines. The smaller measures 2 inches 7½ lines, with a tail of 1 inch 6 lines. The former is evidently a very old individual, the teeth being much worn, and the tail nearly naked and almost quite square.

A third specimen seems also referrible to this species, but differs from both those just alluded to in being less bulky for its length, with the head not so broad, and the snout more attenuated. The dentition is nearly similar, but the fifth lateral incisor above is rather more obvious from without, and the first four do not diminish in size quite so rapidly. The feet are similar. The tail also is of the same form, as well as thickness, but better clothed with hairs, the hairs being longer, especially the pencil at the extremity, and standing more out. The colour of the under parts is somewhat darker, or of a more dirty ash-grey, and blends more gradually at the sides with that of the upper. The length of this specimen is 2 inches 5 lines. Its proportions, with the exception above alluded to, are not materially different from those observed in the other individuals.

(4.) *S. labiosus,* Nob.—By this name I propose to designate a species which, though very nearly allied to the *S. tetragonurus,* offers, I think, sufficient peculiarities to be considered distinct. If it had been already noticed by any author, it has not been described in such a manner as to admit of its being identified,

or possibly it may have been confounded with the one just mentioned. In many of its characters it approaches the *S. cunicularius* of Bechstein, which, in a former paper, I considered, though perhaps erroneously, as synonymous with the square-tailed shrew of this country. There are two specimens of this new species in the collection, precisely similar, excepting that one is a trifle larger than the other. Both, however, have the appearance of being young, and I suspect that in the adult state they would exceed the ordinary dimensions of the species last noticed. They are of different sexes, and the female, which is the smaller of the two, does not appear, from the contracted state of the uterus and its appendages, to have been ever impregnated.

In its general form, this species, as already observed, resembles the *S. tetragonurus*, so much so indeed as to render a detailed description unnecessary. It chiefly differs in the snout being broader before the eyes, more swollen about the lips, and more obtuse at the extremity. The head also appears longer, the distance being greater from the ear to the eye. The cranium, however, when extracted from the investing integuments, is precisely similar both in size and form. The dentition is the same. The feet are decidedly broader and stronger; the claws long, and well formed for digging. The tail is rather better clothed with hair, and the hairs not so appressed. The colours are for the most part similar, but somewhat darker on the under parts.

Dimensions.

	(Male.) In.	(Male.) Lin.	(Female.) In.	(Female.) Lin.
Length of the head and body	2	6½	2	4½
——— of the head	0	11½		
——— of the tail	1	8	1	6
——— of the hind foot	0	6½	0	5¾
——— of the fore foot	0	4½	0	4
——— of the ears	0	1¾	0	1½
From ear to eye	0	4¾	0	4½
——— to the end of the snout	0	10	0	9

I have termed this species *labiosus* or *full-lipped*, in reference to its most distinguishing peculiarity. This character, however, is only noticeable when compared with that of the other species in the *same* section. The lips are not more

tumid, or the snout broader, than in the *water-shrew*, though nearly as much so as in that species.

(5.) *S. pygmæus*, Pall. A single individual of this species, first discovered by Pallas, and within these few years so well described and represented by Gloger*, exists in the collection. The species is remarkably distinguished from every other I am acquainted with by its small size, slender form, long narrow head, with the snout very much produced and attenuated. The distance between the eyes is contained more than two and a half times between the eye and the extremity of the snout. The whiskers are very long. The dentition is for the most part similar to that of the *S. rusticus* described in a former paper. The fifth lateral incisor above is visible from without, and not out of the line. The ears are slightly larger than in the *S. tetragonurus*, and somewhat less concealed by the hair. The feet are much more slender than in the species last mentioned, but rather stronger than in the *S. rusticus*: the toes very bristly, the bristles projecting further beyond the roots of the nails than in either of the two species just alluded to: the claws sharp and curved. The tail is rather thick, roundish, and well clothed with longish hairs, which stand out at the sides, and form at the extremity a moderately long pencil projecting two lines or more beyond the bone. The colour of the upper parts is reddish brown or rusty; that of the lower greyish white, tinged with red. The lips and feet are white, tinged with reddish. The tail bright fulvous above, paler beneath.

Dimensions.

	In.	Lin.
Length of the head and body	2	$2\frac{1}{2}$
——— of the head	0	$9\frac{1}{2}$
——— of the tail	1	4
——— of the hind foot	0	5
——— of the fore foot	0	$2\frac{3}{4}$
——— of the ears	0	$1\frac{3}{4}$
From ear to eye	0	$3\frac{3}{4}$
From ear to the end of the snout	0	$8\frac{1}{3}$

This species appears to have been formerly involved in some obscurity; but its history has been well cleared up by Gloger,

* Nov. Act. Leop. tom. xiii. 2. p. 481. pl. 25.

to whose paper I beg to refer the naturalists of this country, as containing a most detailed account of all its characters. It is the *S. exilis* of Gmelin.

P.S. Since the above notes were written I have seen Nathusius's paper on the European shrews, alluded to by the editor in a former number of this journal*. He does not appear to admit of more than two species belonging to the group termed by Duvernoy Amphisorex. Of course, therefore, that which I have above named *S. labiosus* is either unknown to him, or, what is perhaps more probable, would pass as a mere variety of the *S. tetragonurus.* And I am far from saying that this last opinion might not ultimately prove correct. Nevertheless, as I have seen two specimens exactly similar, I feel induced for the present to consider it as distinct.

I may also state, that since it clearly appears now that the *S. tetragonurus* of Hermann was known to Linnæus, and the very species originally described by him in the first edition of the 'Fauna Suecica,' under the name of *S. vulgaris*†, it will be proper, in accordance with Nathusius, to adopt the name last mentioned for this species, and to allow that of *tetragonurus* to sink as a synonym. It will also be advisable to transfer the English name of *common shrew* from the *S. rusticus* to this species, which is far more abundant in this country, and seems to be the species most universally distributed throughout Europe. Those naturalists who wish to have an English name for everything might call the former the *rustic shrew.*

Swaffham Bulbeck, Nov. 28, 1838.

XXXVII.—*Description of two new Orchideous Plants, from the Collection of C. S. Parker, Esq.* By Sir W. J. Hooker, L.L.D., Reg. Prof. Bot. Glasgow, F.R.S., L.S.

[With Plates.]

1. Pleurothallis aristata.

Nana, foliis petiolatis spathulatis, racemo paucifloro, sepalis æqualibus lanceolatis aristato-acuminatissimis maculatis 3-nervibus 2 lateralibus basi connatis, petalis sextuplo minoribus oblongo-acuminatis longe ci-

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* Vol. i. p. 427, *note.*

† In the second edition of that work the name is changed to *Araneus.*

liatis uninervibus, labello trilobo, lobo medio elliptico pubescenti-velutino. (Plate XV.)

Hab. British Guiana.

Cultivated in the stove of C. S. Parker, Esq., of Liverpool, having been received with many other rarities from Demerara. Whole plant scarcely 3 inches high. Leaves 3, in our specimen spathulate, acute, an inch or an inch and a half long, including the slender petiole into which it gradually tapers. Scape very slender, twice as long as the leaves, bearing a raceme of 3—4 flowers half an inch long. Perianth erect. Sepals equal, lanceolate, 3-nerved, concave, dingy yellow, spotted with purple, much acuminated, so as to be almost aristate at the extremity, the two lateral ones united at their base. Petals about one third the length, and about one third the breadth of the sepals, oblong, 1-nerved, acuminate, almost aristate, and strongly ciliated at the margin. Lip as long as the petals, fleshy, contracted a little above the base, narrow, oblong, 3-lobed, the side lobes obtuse, incurved, the middle one elliptical, clothed on the upper side with velvety down. Column wingless, slender, shorter than the petals. Anther conical, oblique.

The two lateral sepals are but slightly combined, and though not serrate they are concave below, so that this plant seems almost to combine the characters of *Specklinia* with *Pleurothallis.*

Plate XV. A. *Pleurothallis aristata*, nat. size. Fig. 1, flower; fig. 2, the same laid open; fig. 3, petal; fig. 4, labellum; fig. 5, column and anther, magnified.

2. Stelis foliosa.

Nana, foliis subtribus lineari-oblongis, scapo foliis breviore, spica subcompacta, floribus subcernuis, petalis lingulatis sepala subæquantibus, labello trilobo, medio dense glanduloso. (Plate XVII.)

Hab. British Guiana; whence it was introduced in a living state by C. S. Parker, Esq.

Root small, fibrous. Leaves 3—4, of which 2 are nearly equal in length, 2—3 inches long, linear oblong, rather waved, below there are one or two smaller ones. Scape shorter than the foliage, bearing a short and rather compact spike of 12—14 flowers, throughout of this same uniform pale greenish colour, slightly drooping, each subtended by a small

acute bractea. Sepals equal, broadly oval or nearly orbicular, very concave. Petals lingulate, obtuse, slightly concave. Lip equal in length with the petals, divided to the middle into three obtuse segments, of which the middle one is the largest and broadest: the centre of the lip is clothed with a broad line of dense glandular down, reaching from the base almost to the apex. Column much shorter than the perianth, thick, fleshy, rhomboid. Anther hemisphærical.

Plate XVII.* A. *Stelis foliosa*, nat. size; fig. 1, flower-bud; fig. 2, flower expanded, in its natural position; fig. 3, the same inverted and more expanded; fig. 4, column; fig. 5, petals; fig. 6, labellum; fig. 7, side view of the labellum; fig. 8, pollen masses, magnified.

XXXVIII.—*Catalogue of the Slender-tongued Saurians, with Descriptions of many new Genera and Species.* By John Edward Gray, Esq., F.R.S., Senior Assistant in the Zoological Department of the British Museum, &c.

[Continued from p. 293.]

Dasia. Toes 5—5, short, lower joint rather thick, with transverse plaits beneath, upper ones compressed and slightly arched; the index and middle finger equal, the next finger a little shorter, thumb large; ears closed over by the scales, not apparent (nor apparently fringed); muzzle short, rounded; tail tapering.

Dasia olivacea. Olive, back of the head-shield black; the back with 12 cross series of scales with a central white spot and a black spot on the sides; the band sometimes interrupted; scales 3 or 5 keeled, 3 or 5 toothed behind, the 2 lateral keels close together; hinder part of the sides, and sides of the tail with 2 broad white streaks; chin and beneath green, not spotted.

Prince of Wales's Island. Mus. Chatham.

Aprasia. Head small, with 2 pairs of rather large frontal shields, which also cover the cheeks; a large 6-sided elongate vertebral, and a pair of small superciliary, shields; labial shields rather larger, few; eyes large, round, eyelids rudimentary, pupil round; nostrils small, in the suture between the top of the first labial and anterior frontal plate; muzzle rounded, rather produced. Ears none; body cylindrical elongate, covered with uniform hexangular smooth scales;

* This plate will form part of the Supplement.

tail as long as the body, rather tapering, covered with scales like the body, those on the under side being rather the largest.

Aprasia pulchella. Pale olive; head brown lined; scales pale edged, those of the back and sides with 1 or 3 oblong longitudinal spots forming interrupted lines; beneath pale greyish, scales darker edged; tail brown lined and beneath whitish. Length of body $2\frac{3}{4}$, of tail $1\frac{3}{4}$ inches. The scales of the occiput are rather larger than the rest, and the front of the vent is covered with scales like the rest of the body.

New Holland. Brit. Mus.

Herinia. Ears none; otherwise like *Tiliqua*, toes 5—5; scales smooth, thick.

Herinia capensis. Pale olive; back darker varied, with a silvery streak on each side; sides dark brown; beneath silvery white.

Cape of Good Hope.

*** *Muzzle rounded; body subcylindrical, elongate; limbs* 4, *far apart.*

Riopa, Gray. Toes 5—5, unequal; ears distinct; head shields normal; front toes much longer, the two inner more slender than the rest.

Riopa punctata, Seba, ii. t. 12. f. 16. Seps scincoides, *Cuv.* Lygosoma punctata, *Gray, Anim. Kingd.* Scincus Cuvieri, *Cocteau.*

Bengal. Brit. Mus.

Riopa Ruppellii, Seps scincoides, *Mus. Francfort,* not *Cuv.* Pale olive, silvery, very finely punctuated, with a whitish streak on each side, edged beneath with a dark line; beneath whitish.

Arabia Petrea? Mus. Francfort.

Riopa Brougainvillii, Scincus Brougainvillii, *Cocteau MSS.* Bronze olive; back with two or four interrupted series of black spots with a broad dark brown stripe from the eyes over the legs on each side; belly and lower parts of the sides pale and black spotted; tail brown, sides dark varied, the front toes rather longer than in the former.

New Holland.

Lygosoma, Gray. Toes 5—5; ears distinct; head shields ——?

Lygosoma abdominalis, Lacerta abdominalis, *Thunb.* L. serpens, *Gray, Zool. Journ.* not *Synon.*

India, Java. Brit. Mus.

Lygosoma australis, n. s. Back dark golden brown, darker varied, with a broad pale golden streak down each side; sides grey, closely black dotted.

New Holland. Mus. Chatham.

Chiamela, n. g. Toes 4—4; ears very small? or none? head like

Tiliqua, but with the vertebral shields placed one before the other, and no anterior occipital one.

Chiamela lineata. Golden brown, with longitudinal black lines, one placed in the centre of each series of scales; head brown; shields pale-edged.

India. Brit. Mus.

Chiamela Duvaucellii, Scincus Duvaucellii, *Cocteau*? Pale with a series of minute black specks; sides dark, white-spotted.

N. Holland, King George's Sound. Mus. Paris.

Exactly like *Scincus Duvaucellii* in colour and form, but toes 4—4 thicker, shorter and of different proportional length.

Tetradactylus, Cuv. Toes 4—4; ears none; head with one rostral, one anterior, and one posterior frontal, separated by two small shields; two vertebral, three occipital and four or five superciliary shields.

Tetradactylus decresiensis, Cuv. Pale brown, with three dark brown dorsal streaks, the central streak broadest and interrupted.

N. Holland. Mus. Paris.

Ristella. Toes 4—5, short; ears distinct; head shields ——?

Ristella Rurkii. Crown and back pale brown, shining; scales 6-rowed, each of four central rows with a blackish central spot, forming four longitudinal series of spots; sides white-dotted; chin and belly white.

North India, Dr. Rurk. Mus. Chatham.

Hagria. Toes 5—4, rudimentary, nearly equal, compressed, clawed; head shielded; ears small, dot-like; scales smooth, equal, with white netted lines.

Hagria Vosmaerii, Scincus Vosmaerii, *Cocteau.* Brown, minutely black dotted, beneath pale.

Java. Mus. Paris.

Tridactylus, Cuv. Toes 3—3; ears ——? head shields ——?

Tridactylus decresiensis, Cuv. Pale brown with dark longitudinal lines, beneath whitish, brown netted.

New Holland. Mus. Paris.

Seps, Merr. *Zygnis*, Fitz. Toes 3—3; ears distinct, deep; head shields like *Tiliqua*, but rostral scales longer; nasals very small, and no anterior occipital shield.

Seps tridactylus, Rapp. Seps Chalcidica, *Risso.*

Seps vittata, Leuckart, Breves, 1818.

Seps multivirgatus, Boie. Mus. Leyden.

Siaphos, Gray. *Perameles*, Wiegm. Toes 3—3; ears none; eyelid distinct; head shields like *Tiliqua*, but without any posterior

frontal shields, the anterior frontal being large and placed in front of the vertebral, and the anterior occipital plates rather large.

Siaphos æqualis, Gray, Griff. A. K. Peromeles æqualis, *Wieg.* Seps æqualis, *Gray, Ann. Phil.* 1828.

Hab. ——? Brit. Mus.

**** *Muzzle rounded; body subcylindrical; legs two, posterior, placed on the side of the vent ending in one or two acute toes.*

Ophiodes, Wagler. Feet tapering, acute, undivided; ears none; eyelid distinct.

Ophiodes striatus, Pygopus striatus, *Spix. Braz.* Seps fragilis, *Raddi.* Pseudopus Olfersii, *Lichst.* Mus. Paris.

Jun.—*Pygopus Caryococca*, Spix. Braz.

Brazils. Brit. Mus.

***** *Muzzle rounded; body subcylindrical; legs none.*

Anguis. Ears hid; eyelids distinct.

A. fragilis, Linn. Brit. Mus.

Siguana, Gray. *Otophis*, Fitz.? Ears exposed.

Siguana Ottonis, Gray, Griff. Anim. Kingd.; Otoph. Eryx, *Fitz.*?

Europe. Mus. Breslau.

Stenostoma, Fitz. Ears none? eyelids none.

Stenostoma ——?

Tortrix melanostriata from Russel, Ind. Rept. i. 148. appears to form a new genus of this division.

Dorfia. Ears hid; head with three vertebral plates, the frontal pair between the small first vertebral and the larger second one, the third between the oblique occipital ones; eyebrows and cheeks covered with small scales; ventral scales not larger than the rest.

Dorfia punctata. Crown and back white; nape with a central black streak ending in a line of black spots; cheek, sides, and beneath black; lower lip white-dotted.

Cape of Good Hope. Mus. Chatham.

Gymnophthalmidæ. Tongue contractile, head shielded, rostral shields small rounded; eyelid none; back, belly, and sides covered with smooth uniform imbricate scales; vent transverse linear, with scales in front.

Microlepis, n. g. Toes 5—5; ears large; head depressed; scales moderately grooved; head with five vertebral plates.

Microlepis undulata. Tiliqua microlepis, *Gray, Griff. Anim. Kingd.* 71. Silvery, back with brown wavy bands.

Hab. ——? Brit. Mus.

Ablepharus. Toes 5—5; ears distinct; front of vent shielded;

scales six-sided, divided by a central transverse white line, with six or eight longitudinal lines on each side.

A. panonicus, Fitz. Berol. Mag. 1824. t. 14.

A. cupreus, n. s. Golden green, brown mottled, with a narrow pale green sinuous streak on sides of the back.

Hab. —— ? Brit. Mus.

Gymnophthalmus. Toes 4—5, "Wagler." Ears —— ?

G. lineata, Lacerta lineata *and* L. 4-lineata, *Gmel.* G. 4-lineata, *Neuwied, Braz.*

Hab. —— ? Mus. Berlin.

Cryptoblepharus, Wiegmann. *Petia*, MSS. Gray. Toes 5—5; ears —— ? front of vent scaly; scales —— ?

Crypt. Leschenaultii, Wiegmann. Ablepharus Leschenaultii, *Cocteau Mag. Zool.* t. 1.

Crypt. pœcilopleurus, Wiegmann, Act. Acad. Nat. Cur. xvii. t. 18. f. 1.

Lerista, Bell. Toes 2—3; ears none.

Lerista lineata, Bell, Proc. Zool. Soc. 1. 99.

Australasia. Mus. Bell.

Rhodona (*Rhodonidæ*). Rostral plate rather produced, large depressed, with a rather sharp edge; feet rudimentary; nostrils superior in the centre of an oblique triangular scale, occupying the back edge of the rostral plate; vertebral plates three, one behind the other, the middle largest, hinder triangular; superciliary plates moderate; ears very small, nearly hid? eyes small, with only rudimentary eyelids. Body elongate, subcylindrical, covered with uniform small imbricate scales; feet four, far apart, the front ones rudimentary, short, small, conical, undivided, ending in a simple claw, hinder small, weak, with a distinct knee, and ending in two very unequal clawed toes; tail elongate, cylindrical, tapering.

Rhodona punctata. Grey brown, back with rows of small black spots, those of the middle of the back and tail largest; labial scales brown-edged. Body four, tail three inches. Eyes small.

New Holland.

The genus *Rhodona* appears to form a distinct family, (characterized by the form of the rostral shield, the position of the nostrils, and the number of the vertebral shields,) which I propose to call *Rhodonidæ*. Probably the genus *Lerista* of Bell may belong to the same group, but the form and number of the head shields of that genus has not been described.

Soridia, Gray (*Rhodonidæ*?). Head small, rostral plate rather pro-

duced, large, with a rather sharp edge, lower one similar, but smaller; nostrils subsuperior in the centre of an oblique triangular nasal scale occupying the under edge of the rostral; vertebral plates three, one behind the other, the middle one largest, the hinder triangular; eyes small with only rudimentary eyelids; ears none. Body elongate, subcylindrical, covered with uniform smooth imbricate scales; feet two, rudimentary, simple, tapering, ending in a single claw placed on each side of the two præanal shields; tail elongate, cylindrical, tapering, with a central series of similar scales beneath.

Soridia lineata. Silvery, with distant rows of minute black specks and a broad black streak down each side. Length of body 1½; of tail 1½ inch.

Hab. Australasia.

Acontiadæ. Head shielded, rostral shield large, cup-shaped, inclosing the end of the muzzle; nostril dot-like in the middle of the sides of the rostral shield, with a posterior groove to its hinder edge; chin shield like the rostral, but smaller. Body subcylindrical, covered with smooth imbricate scales; feet rudimentary, sometimes wanting; tongue short, like the *Scincidæ*; scales with a transverse central line, and close parallel longitudinal white internal lines.

Nessia, n. g. Body cylindrical, head shielded; ears distinct, dot-like; feet very short, rudimentary, divided into three very short subequal toes; claws sharp, central rather the longest; eyes distinct; eyelids ——? Tail thick, elongate, cylindrical.

Nessia Burtonii. Pale brown, centre of scales darker, beneath pale.

Hab. ——? Mus. Chatham.

Named after Dr. Burton of Chatham.

Evesia, n. g. Head shielded, with three vertebral shields, two first large and transverse, four-sided, 3rd triangular, and several oblique occipital shields, loreal shield long; body and tail subcylindrical, covered with equal smooth six-sided scales; feet four, simple, thin, weak, rudimentary, far apart, covered with scales, end undivided, ragged.

Evesia monodactylus, Bell. Pale brown, scales smooth, dark edged; tail darker.

Hab. ——? Mus. Bell.

Bipes. Body subcylindrical; legs two, posterior, on the sides of the vent, feet unequally 2-lobed; ears none.

Bipes anguineus, Merrem. Anguis bipes, *Linn. Seba,* i. t. 86. f. 3.

Lacerta bipes, *Gmelin.* Seps lineata, *Harlan, Journal Acad. Philad.* iv. t. 18. f. 2.

Cape of Good Hope. Brit. Mus.

Bipes Gronovii. Pygodactylus Gronovii. Mus. Leyden.

Acontias. Body cylindrical, apodal; eyes distinct, oblong, large, surrounded with a series of scales; scales with parallel white longitudinal internal lines, which are divided into two series by a central cross line (best seen in the white scales).

Acontias meleagris. White with the hinder edges of the upper scales dark brown.

Cape of Good Hope. Mus. Chatham.

Var. Above brown, beneath white.

Cape of Good Hope. Mus. Chatham.

XXXIX.—*On the Breeding of the Woodcock* (Scolopax rusticola, Linn.), *in Ireland.* By Wm. Thompson, Esq., Vice-President of the Natural History Society of Belfast.

In the 1st volume of the 'Annals of Natural History,' (p. 158.) I alluded to the circumstance of woodcocks having bred within the last few years in some of the northern, central, and southern counties; at the same time stating it to be my intention to reserve a detailed notice of the fact, until the species should in due order come to be treated of in my intended series of papers on the birds of Ireland. The subject being however interesting in more than a mere ornithological point of view, it is considered better now to publish my notes upon it, leaving the general history of the bird, independently of this part of its œconomy, for the place just mentioned.

Of the occasional breeding of the woodcock in England, instances have been recorded in the chief works on ornithology published in that country within the last seventy years. Thus Pennant informs us, that "in Case-wood, near Tunbridge, a few breed almost annually; the young having been shot there in the beginning of August*." He adds, "I do not recollect that any have been discovered to have bred in North Britain," p. 367. Latham states that "a brace of them were shot in Chellenden Wood by the gamekeeper to Horace Mann, Esq.,

* Brit. Zool. vol. ii. p. 366. ed. 1776.

May 1, 1769, and another brace the day before; they were sitting on their young*." This author gives one other instance, in which a friend of his met with a woodcock on its nest, in a wood near Farningham, Kent. In his Ornithological Dictionary†, Montagu mentions his having received eggs of this bird from near Battel in Sussex; and in the Supplement to the same work, relates, on the authority of Mr. Foljambe, that in May 1802, a half-fledged woodcock was taken in Brodsworth Wood, near Doncaster, in Yorkshire; and that on the 5th of April 1805, a brood of four was hatched at Shireoaks, near Worksop, Nottinghamshire. Mr. Selby narrates, that "in Northumberland, the woodcock has been known to breed in the woods about Netherwitton," and adds, "I have now in my collection eggs taken from a nest in Pigdon Wood, not far from Morpeth‡." Within the last few years we learn from the 'Proceedings of the Zoological Society of London,' and the periodicals devoted to Natural History§, that the number of woodcocks nestling in England and Scotland is greatly on the increase; and, as may be inferred, the number of these birds occurring during summer in Ireland has likewise been increasing within the same period.

Of the woodcock's actual breeding in this country I have not seen any record, and of its presence here in summer only the following notice, which appeared first in a newspaper—the Belfast Commercial Chronicle—and subsequently in a more abiding place, having been transferred to the pages of the Magazine of Natural History. "On the 8th of August 1828, a fine woodcock was shot in Florida demesne, county of Down; as it was seen in the course of the spring, it is supposed to have remained in the country since last winter," vol. ii. p. 87. By the late T. F. Neligan, Esq., of Tralee, a young and ardent naturalist (whose recent death is much to be deplored), I was informed that a woodcock had been seen in the county of Kerry in the month of July 1832‖. In the county of Antrim,

* Gen. Syn. of Birds, vol. iii. part i. p. 130. 1785.

† Published in 1802; the Supp. in 1813: see article Woodcock.

‡ Illus. Brit. Orn. vol. ii. p. 108. 1833.

§ See Magazine of Natural History, vol. i. p. 83; vol. ii. p. 86; vol. v. p. 570; vol. viii. p. 612; vol. ix. p. 543.—New Series, vol. i. p. 52, 121, 337, 439.

‖ It is thought proper to notice odd birds seen at this season, as they can

at the opposite extremity of Ireland from that of Kerry, a pair of these birds bred at Claggan, the property of Earl O'Neil in 1834. My informant, the gamekeeper, states that in the month of April in that year, a nest was found containing four eggs, all of which were successfully incubated; it was placed in a slight depression of the ground under a hazel, and had a little grass and moss in the bottom for the reception of the eggs: the bird was very tame when on the nest, and permitted the approach of my informant within a yard of her*. This same year (1834), I saw a young woodcock in the shop of Mr. Glennon, bird preserver, &c. Dublin, who "set it up"; he informed me that it was shot at Wilton in the county of Wexford, and was received by him in a recent state on the 8th or 9th of May: he at the same time stated, that in the preceding summer of 1833, a young bird of this species, shot in company with one of its parents at the seat of Lord de Vesci in Queen's county, was sent him to be preserved, and was likewise forwarded when recent. By Thomas Walker, Esq. of Belmont, near Wexford, I have been favoured with the following particulars under date of May 19, 1837. "As to the breeding of woodcocks in this country, I was in the second week of May sent a couple of young ones half-fledged†, that were taken out of a nest at Wilton in this county, the seat of Mr. Alcock. The nest was on the ground among brushwood, and the cry of the young birds like the sound produced by a child's whistle. At the time I received the young birds, there was at Ballyarthur, county of Wicklow, the seat of Mr. Bailey, a nest with four eggs in it; this is the third year they have bred at Wilton." Mr. Walker on another occasion mentioned the woodcock as frequenting for a similar purpose the covers of Killoughrim Wood in the county of Wexford, and remarked upon the young indigenous specimens he had examined, that "although fully as large as old birds, they had not got the strong feathers in the tail, but instead a soft curly down." In

hardly be presumed in every instance to have been solitary individuals, though their mates may have escaped notice.

* The tameness of the woodcock in its nest is mentioned by Pennant and Latham, and from the observation of many persons who have witnessed it, seems to be universal.

† For one of these I am indebted to Mr. Walker.

the month of June or July 1836, a woodcock was shot, and another seen about the same time at Springvale, county of Down, the residence of Major Matthews. On the 4th of June 1837, an old female bird was killed at the vale of Ovoca, county Wicklow. In May 1838, a woodcock was captured at Stormont near Belfast.

At Tullamore Park in the county of Down (the seat of Lord Roden), beautifully situated at the base of the mountains of Mourne, and possessing considerable variety of surface, abundance of wood of various size, and occasional moist and open glades, which even in the driest summer would afford food to the woodcock, this bird has bred of late years. From the intelligent gamekeeper I have learnt the following interesting particulars. In 1835 he first (though living here since 1828) became acquainted with their continuing throughout the summer in the park. The first nest he saw, which had just the appearance of a partridge's or pheasant's, was situated on damp ground in a young plantation, and at the root of a young larch fir. It contained four eggs, on which the old bird sat so close as to allow him and other persons to approach within a foot, but when they came near she was always observed to hide her bill to its base in the grass or withered ferns about the nest; the eggs were all productive, and were he thinks incubated for three weeks. The young left the nest just after birth, and were not again seen until able to use their wings, when they frequently appeared about the place: the male bird remained about a dozen paces from the nest during the incubation of his partner. From having seen other woodcocks in the park this summer, it was believed that they must also have nests, but this one only was discovered; eventually however, a second pair of woodcocks was sprung along with five young ones, the old birds taking first to flight: the young —completely feathered except on the head and neck, where down was still displayed—were now able to fly over the trees, whilst those produced in the nest first mentioned, were but three days "out."

In the summer of 1836, my informant saw in one day five old woodcocks in the park; and though he had not any of their nests this year, he on one occasion saw three young birds.

He is of opinion that woodcocks pair before leaving this country in the spring for more northern climates, and remarks, that in their evening flight at this season they "twist" amazingly, the hinder one following the foremost through every curve or sinuosity of its course, which is extremely rapid. Their call may now be expressed by the word *hisp*, and by the accurate repetition of which he has brought them back when flying past him; during the breeding season they, in addition to this, have calls which sound like *waap-waap—weep-weep*, succeeding each other, and repeated as here set down: both sexes are considered to make use of the two calls. At the season of incubation, they call at early dawn, and at this period their flight is very different from that in the month of March, being now slow or with the wings scarcely moving; but occasionally they may be seen circling about "as if in play," at all events, describing such a course as evinces that they cannot be in search of food. In winter, my informant believes woodcocks to have a regular line of flight from the covers to their feeding-ground, and acting upon his belief, has, by taking his stand at particular spots, shot many in flying over them.

In 1837 three nests were found at Tullamore, the first early in the month of April, when it was surrounded with snow; they were all sheltered by young trees, and one of them within twenty yards of where a nest had been the preceding year: in each were four eggs, all of which were productive, the young appearing in April. The nests here have in every instance been in slight hollows of the ground, with a little grass or dead leaves in the bottom for lining. To withdraw attention from one of these nests when containing young, the parent tumbled about as if wounded, thus feigning to a greater extent than the gamekeeper had ever before witnessed in any species of bird; and at the same time she gave utterance to a note distinct from those before mentioned, or as expressed to me, "screaching with rage*." The young birds are said to be beautiful in the down, being mottled with black where their parents are so, and cream-coloured where they are brown.

* When disturbed during incubation, they merely fluttered off the eggs, and alighted at a short distance.

About the second week of June, a fourth brood was seen, of which the nest was not found.

In 1838, one nest containing four eggs (which may be considered the ordinary number) was observed in the park; the young appeared in April: by the middle of this month they have generally come out here*. Long after the general departure of the woodcocks for the north this year, the gamekeeper saw what he believed to be five distinct brace of these birds in one portion of the park, and considers that they were more numerous than in any previous summer. The nests were not discovered as usual, in consequence of boys, by whom they were all found on former occasions, not having been employed in the young plantations. Daily throughout the year, the gamekeeper now either sees or hears woodcocks without going out of his way or attending to them; indeed they fly very much about his cottage, situated in a beautiful open glade, and from about its door may be seen on wing every evening. I obtained this information when at Tullamore Park in the month of August 1836, and in June last†. On the 28th of this month I visited the park in the hope of seeing some of these birds, but the evening was so fine and light that they did not commence flying until it was very late, and then darkness suddenly came on. At half-past nine o'clock the first

* In the 9th volume of the 'Magazine of Natural History' (p. 543) it is stated of three nests found in a wood near Derby, that the young were hatched in the month of April. In vol. i. (New Series) of this same work, it is remarked, in a notice of its breeding in Ross-shire, that the woodcock "hatches early, often at the latter end of March, but generally by the first week of April." On the 10th of this latter month, the writer of the communication to the Magazine, saw woodcocks sitting on their nests, one of which contained eggs.

† Some few points on which naturalists are agreed have perhaps been unnecessarily introduced, but coming from an intelligent man who has had ample means for observation, it was considered better to include them. In proof of Tullamore Park and its vicinity being a favourite resort of the woodcock, it may be stated, that the gamekeeper has with a brace of pointers killed eight brace of these birds during a forenoon in the heath skirting the plantations, and with the aid of one dog and a boy to beat the covers, has shot ten brace within a similar time in the park. In the severe snow storm of 1827, three gentleman on a visit here, and not going out before noon, killed and bagged seventy-five brace in three days; and giving themselves no trouble in looking after wounded birds, many more which had fallen by their guns were afterwards picked up. During the month of January 1838, about 100 brace were obtained by occasional shooting. The gamekeeper considers that he has seen so many as eighty brace in one day.

were heard, when a pair swept past within about thirty yards, uttering the two calls before described, and in the order in which they have been set down. From this time, and until half an hour had elapsed—when it was in vain to attempt seeing them—several were heard, and all, I think, single birds, which gave utterance only to the other call stated to resemble in sound the word *hisp* quickly uttered.

The description of the habits of these birds about the period of incubation, given by the gamekeeper at Tullamore Park, strongly reminded me of the first good account I had read of them, which is contained in a highly interesting notice of the breeding of woodcocks in Ross-shire, communicated by Sir F. Mackenzie to the Zoological Society of London*. The manner of flight is so different after the birds are paired, from what the sportsman is accustomed to witness at other periods, that I am induced to call attention to the similarity of testimony in the two cases. "Than the flight of the woodcock before and after incubation, Sir F. Mackenzie states that he knows nothing more rapid, as for an hour or two about dusk he (probably the male, though two have been seen pursuing each other) flies in large circles over the tops of the trees." To a sportsman, at least, words could not better convey an idea of the velocity of its flight than those of my informant, who, an experienced "shot," describes it to be such on these occasions that he cannot "get his gun upon them," or in other words, if the uninitiated require explanation, a velocity so great as to prevent his taking aim.

In a communication made by my friend Mr. Selby to the 'Magazine of Zoology and Botany,' on "the woodcock breeding in Scotland," it is asked, "What reason is to be assigned for this change in their habits? Is it to be attributed to a change in our seasons, or are we to look for it in the great increase of woods or plantations so general over all the island, affording these birds additional and secure retreats, as well as an abundant and constant supply of food?" vol. i. p. 201. Although it is not for me to attempt an explanation of that, respecting which Mr. Selby appears dubious, it may perhaps be allowed me to offer a few observations on the most

* Proceedings of Zool. Society, 1832, Part II. p. 133.

interesting points in connexion with the subject, or, to speak more particularly, on the causes which have influenced these birds to remain through the summer with us.

In the first place, it must not be overlooked, that during the last few years, the number of woodcocks stated to have continued throughout the year has increased so much in England and Scotland, that, during the same time, there has been greater attention bestowed on such facts than at any former period, and in consequence, there have been periodical publications—the Magazine of Natural History leading the van—in which any isolated instance of the kind might be recorded, that would hitherto have been unpublished. But even taking this circumstance into consideration, there cannot I think be the least doubt that there has been an increase in those countries; and in Ireland there unquestionably has been*.

That this originated from wounded birds unable to undertake the vernal migration seems the most untenable of all reasons which have been assigned for it, inasmuch as the same cause existed previously. Why should the number of wounded birds have been greater over the British Islands generally within the last few years than at any former period? Did our sportsmen become at once more numerous, and is their aim less sure? Of what avail are all the "appliances and means" of modern "warfare," as the patent cartridge, patent wadding, and percussion caps, if more wounded and unbagged birds are left behind than formerly?

The spread of plantations over the face of the country appears to be the predisposing cause, though insufficient to account altogether for the circumstance. These countries certainly had always abundance of places adapted to the nestling of the woodcock; and though plantations, chiefly in tracts unsuited to cultivation, have been very much extended of late years, others again, especially in Scotland and Ireland, of native growth, and from the excellent cover they afforded, admirably adapted to this end, have been swept away, and the

* This fact appears the more singular on account of the number of woodcocks that winter in the British Islands having diminished rather than increased of late years.

ground they occupied been converted to purposes of pasture or tillage. It may be remarked, that plantations of very different character are selected by the woodcock for its nest: thus Sir F. Mackenzie observes, "the soil where the nests were found (at Conan, Ross-shire) is gravelly and rather dry; the grass tolerably long, *without underwood*, and the trees, oak, birch, and larch, not exceeding 30 years' growth." In another instance, where three nests were found in the same wood near Derby, we learn that "the underwood was thin and of not more than from seven to ten years' growth*." Again, we are told, that of two nests at Brahan Castle, in Ross-shire, the one "was in withered grass, partially screened by spray and brambles," the other "amongst pruned branches at the root of a large larch tree†." The nests before mentioned, in the counties of Antrim and Wexford, are said to have been in thickets. The sites pointed out to me at Tullamore park were all in an extensive young plantation, consisting chiefly of larch fir, apparently of about eight years' growth; here there is not much other cover, the place having originally been a heath-covered tract: it however joins a park rich in fine timber and a profusion of underwood. A friend just returned from shooting in Inverness-shire informs me, that in an indigenous birch wood, on the banks of Loch Ruthven, and containing but little coppice, some pairs of woodcocks have nestled for the last few years.

Our "change of seasons," or more equable climate of late years, by reason of the milder winters, and the summers being colder and more humid, speaking in general terms, than they were even at a recent period,—although the nearer they approximate, the more widely they, in this very respect, differ from those of high northern latitudes, to which the woodcock chiefly resorts to breed, seems to have had much influence on the increased number of these birds, which at all events breed, and it may be, remain permanently in the British islands‡. It appears evident too, that it was not caused by the peculiar suitability of any one, two, or three summers, as

* Mag. Nat. Hist., vol. ix. p. 543.

† Mag. Nat. Hist., vol. i. p. 121. New series.

‡ It is very obvious, that warm dry summers in *these* countries, as for instance those of 1825 or 1826, would be ill adapted to the woodcock's feeding.

for the last few years woodcocks have been gradually increasing at this season. The general augmentation cannot, I conceive, be attributed merely to the circumstance of the first young birds bred in the country having continued to multiply therein. That they have done so, however, may be fairly considered as evinced in the annual increase of the species about its chief habitats, but is not, I think, sufficient to account for the presence of these birds in the widely distant localities in which they have occurred. Most migratory birds appear to be in some degree affected by latitude in their movements, as well as by the isotherial and isothermal lines, or those under which the mean heat of summer and of winter is the same. From them the woodcock apparently differs, in being influenced solely by climate in the selection of its summer haunts. In the warmest countries it frequents, this species is believed merely to ascend from the plains to the highest mountains to breed*. It is so in the extreme south of Europe, if my informant be correct in stating that they nestle in summer in the mountains of Albania, where in the lowlands they are abundant during winter. To the Alps they resort in numbers in the breeding season; but here another question arises, which will apply to all but the most southern countries, to which allusion has just been made.

Are the birds which breed in the mountains of the extreme south of Europe the same individuals which frequent their base in the winter, or are they from a greater distance, those from their base migrating further northwards, and is this "the order of their going" from south to north throughout Europe? According to this view, the British Islands would be looked upon as the most northern limits of the flight of such individuals as nestle here, and we may readily in such case imagine the birds to be attracted in their vernal flight by the first suitable places, in these islands or elsewhere, that may occur, and at once take possession of them. The two following statements, although they may not go far enough to establish this point, yet seem to favour it in regard to some localities. Sir F. Mackenzie remarks, with reference to Conan in Ross-shire, "It is probable that the parent birds sought this spot for the

* Latham, loc. cit.

purpose of breeding, as they must have arrived in the spring from other localities; for those who shot in the covers till February declare that they did not know of a single woodcock being then left in them, and had there been two or three the keeper must have been aware of it*." In the 'Magazine of Natural History' for 1832 (vol. v. p. 570) it is stated in connexion with their having bred every season for the few years preceding in the woodlands about Darnaway Castle, the seat of the Earl of Moray, "that when the winter set in, the woodcock almost entirely deserted the Darnaway forest." The following extract from an admirable memoir by M. Necker on the birds of the neighbourhood of Geneva, illustrates this further. "La Bécasse (*Scolopax rusticola*) ouvre la marche des oiseaux voyageurs, et c'est déjà vers la fin de Février ou le commencement de Mars que l'on voit arriver dans les forêts au pied des montagnes, ces troupes qui viennent probablement de l'Italie, de l'Espagne, et du midi de la France; où elles ont trouvé un hiver doux, une terre humide et non durcie par les gelées; elles attendent que les neiges des montagnes basses soient fondues, et nous quittent encore au mois d'Avril pour nicher dans les lieux élevés et froids†." But proof is wanted, and it would be difficult to be procured, whether the woodcocks generally, that breed in the British Islands, constantly abide therein, or are of that vast number which leave the more southern countries in the spring in search of suitable climates in which to rear their broods, and where they remain during the summer only. When, however, I consider that the climate of Ireland of late was not unsuitable to this bird at any period of the year, and as it became the more suitable, that in localities otherwise favourable, the number of woodcocks remaining during summer increased the more; that in their chief haunts the species was always to be met with in the interval between which the young broods had strength enough to wing their way to more southern coun-

* In the spring of 1836 numbers of woodcocks were met with in Tullamore park after the ordinary time that the eggs are considered to be laid. On the 7th of April the gamekeeper killed 4½, and on the 11th 3½ brace of these birds. In such quantity they had never been known to remain so late.

† Mémoires d'Histoire Naturelle, &c. de Genève, tom. ii. part 1, p. 35.

tries, and the great body of migratory individuals arrived from the north; I am disposed to believe, as in the case of their ally the common snipe (*Scolopax gallinago*), that the small proportion of woodcocks which breed in this country are permanent residents.

I have not touched upon the subject of any change in the great breeding haunts of the woodcock in high northern latitudes, from my inability to learn anything satisfactory about the matter. It has been stated indeed that the eggs have been much used in Sweden of late years, but it seems improbable that any change in regions so far remote as the ordinary summer haunts of the woodcock can affect the question of its breeding within the British islands.

XL.—*On the Botany of the Channel Islands.* By Charles C. Babington, M.A., F.L.S., F.G.S., &c.*

Having last year had the pleasure of submitting to this Section an account of my botanical observations in the islands of Guernsey and Jersey†, I should not have ventured to occupy the time of this Meeting with anything further on the subject had I not been so fortunate as to make several additions to the Channel Islands Flora during the last few weeks.

I will proceed to mention the names of those plants which had not been noticed in the islands before the present year.

Ranunculus ophioglossifolius. In a very wet marsh in Jersey.

Orchis laxiflora. Common in wet places in Jersey and Guernsey.

Linaria pelisseriana. In one place upon a dry hill side, amongst *Ulex europæus*, in Jersey.

Myriophyllum alterniflorum. In marsh ditches in Guernsey.

Polygala oxyptera. This is probably a variety of *P. vulgaris*, but has been distinguished by several eminent continental botanists. It is frequent in all the islands, and has been gathered by myself near Liverpool.

Ononis reclinata. This plant is very common in Alderney, but has not been noticed in the other islands. It was found several years since on the coast of Galloway in Scotland, by Dr. Graham.

Potamogeton plantagineus. In damp pits from which peat has been

* Read before the Nat. Hist. Sec. of the British Association, at Newcastle, Aug. 20, 1838, and communicated by the Author.

† Published in Mag. of Zool. and Bot., ii. 397.

taken, in Guernsey. Mr. W. Wilson Sanders informs me that he has gathered it in ditches at Ham Ponds, near Sandwich, Kent.

Carex punctata. In wet marshes, in Guernsey. This plant has been submitted to the inspection of Dr. Boott, from whom a monograph on this difficult genus is shortly expected, and he has conferred the name*. It has, I believe, been noticed in several parts of England.

The following additional species have been gathered in these islands, but not in Britain.

Neottia æstivalis, in Jersey.

Sinapis incana, in Jersey. Noticed this summer plentifully in Alderney.

Mercurialis ambigua, in Jersey. This appears to be only a variety of *M. annua,* but is probably the plant of the younger Linnæus.

Atriplex rosea. Jersey and Guernsey. I believe that this will be found to exist upon the south coast of England.

Arthrolobium ebracteatum, in Guernsey. During the present year I have found this plant in plenty in Alderney.

These five were first gathered by myself; the following had been noticed by other botanists previously to my visit.

Allium sphærocephalon.	Armeria plantaginea.
Bromus maximus.	Echium violaceum.
Festuca sabulicola.	Centaurea Isnardi.
Brassica Cheiranthus.	Lagurus ovatus.
Scirpus pungens.	Juncus capitatus.

The total number of flowering plants and ferns which have been noticed in the islands amounts to above 760, of which 20 have not as yet been gathered in Britain. Alderney and Sark have been less carefully examined than Jersey and Guernsey, as I was not able to devote more than a week to each of them, and very little has been done by other botanists. The number of plants which I observed in Alderney is about 330, and in Sark 252; the little island of Jethon supplied me with 115 species, and an adjoining conical rock, called Crevichon, is inhabited by 22 species, nearly the whole herbage consisting of *Silene maritima.*

In conclusion I may be allowed to mention that I am about to publish an outline of the Flora of the islands, under the name of 'Primitiæ Floræ Sarnicæ,' and shall be much obliged to any botanist who may favour me with information on the subject.

Since this paper was read at Newcastle I have learned that *Arthrolobium ebracteatum* has been discovered (in April 1838) in abun-

* Is there not a *Carex punctata,* Gaud.? (457 Reich. Flor. Excurs.)—Edit.

dance on Tresco, one of the Scilly islands, by Miss White of that place. Mr. Woods has gathered *Brassica Cheiranthus* on the sands near Penard Castle, near Swansea; and *Potamogeton plantagineus* exists in Sir J. E. Smith's herbarium, gathered by Mr. D. Turner, at Diss, in Norfolk, and Dr. H. Thompson, in the south of Scotland. In the herbarium of Dr. Johnston, of Berwick, is a specimen obtained by Dr. R. D. Thompson in Ferny Rig marsh, Berwickshire, and I possess a sample of it, gathered by myself in Bottisham fen, Cambridgeshire. In all these cases the plant has been referred to a wrong species, but was suspected to be distinct by Dr. R. D. Thompson. I have lately gathered *Atriplex rosea* on the coasts of Holy Island (Lindisfarn), Berwick, and the Forth near Newhaven, and Mr. Borrer has sent it to me from the Sussex coast.

St. John's College, Cambridge, Oct. 27, 1838.

XLI.—*Descriptions of British* Chalcidites. By Francis Walker, F.L.S.

[Continued from p. 205.]

Sp. 36. Cirr. Cyrrhus, Fem. *Cyaneus, antennæ nigræ, pedes cyanei, tarsi fulvi, protibiæ flavæ, alæ limpidæ.*

Obscure cyaneus: oculi et ocelli rufi: antennæ nigræ; articulus 1us nigro-cyaneus: pedes cyanei; trochanteres fulvi; genua flava; tarsi fulvi, basi flavi, apice fusci; propedum tibiæ flavæ extus fulvo vittatæ, tarsi pallide fusci: alæ limpidæ; squamulæ fuscæ, antice cyaneæ; nervi fusci. (Corp. long. lin. $\frac{3}{4}$; alar. lin. 1.)

June, near London.

Fem. Corpus gracillimum, sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, thorace latius: antennæ graciles, extrorsum crassiores, corporis dimidio longiores; articulus 1us gracilis, sublinearis; 2us longicyathiformis; 4us 3° brevior; 5us adhuc brevior; clava fusiformis, acuminata, articulo 5° plus dimidio longior: thorax longi-ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum, metathorax transversus, mediocris: petiolus brevissimus: abdomen longi-fusiforme, thorace multo longius, supra planum, subtus carinatum, apice acuminatum: oviductus exertus, brevis: pedes graciles: alis nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 37. Cirr. Mycerinus, Fem. *Cupreus viridi-varius, antennæ fuscæ, pedes fulvi; alæ limpidæ.*

Nigro-cupreus: oculi et ocelli rufi: antennæ pallide fuscæ, subtus fulvæ: thoracis latera viridi-varia: oviductus vaginæ nigræ: pedes fulvi; coxæ

nigro-cupreæ; femora pallide fusca; tarsi flavi, apice fusci; protarsi obscuriores: alæ limpidæ; squamulæ piceæ; nervi fulvi, metalis flavi. (Corp. long. lin. 1; alar. lin. $1\frac{1}{4}$.)

Found near London.

Fem. Corpus longum, angustum, nitens, scitissime squameum, parce hirtum: caput mediocre, transversum, breve, convexum, thorace vix angustius; vertex latus; frons abrupte declivis, parum impressa: oculi mediocres, subrotundi, non extantes: antennæ subclavatæ, corporis dimidio longiores; articulus 1us longissimus, gracilis, sublinearis; 2us longicyathiformis; 3us, 4us et 5us lineares, subæquales; clava fusiformis, acuminata, articulo 5° fere duplo longior: thorax ovatus, convexus: prothorax transversus, brevissimus, supra conspicuus: mesothoracis scutum latitudine longius, dorso foveolatum; parapsides remotæ, suturæ bene determinatæ, postice mutuo accedentes; paraptera et epimera conspicua; scutellum obconicum: metathorax mediocris: abdomen fusiforme, acuminatum, thorace longius et angustius, supra depressum, subtus carinatum; segmenta transversa, brevia, subæqualia: pedes mediocres, simplices, subæquales; tarsis articuli 1us et 3us breviores, 2us et 4us longiores; ungues et pulvilli parvi: alæ mediocres, non ciliatæ; nervus ulnaris crassus, humerali fere longior, radialis vix ullus, cubitalis sat longus in alæ discum declivis, apice stigma fingens, bimucronatum.

Sp. 38. Cirr. Adalia, Fem. *Viridi-cyaneus, antennæ piceæ, pedes flavi, femora viridia, alæ limpidæ.*

Læte viridis cupreo-varius: oculi et ocelli rufi: antennæ nigro-piceæ; articuli 1us et 2us viridi-picei: abdomen cyaneo-viride cupreo-varium: oviductus vaginæ fuscæ: pedes flavi; coxæ virides; femora viridia, apice flava; tarsi apice fusci: protarsi fulvi: alæ limpidæ; squamulæ piceæ; nervi proalis fusci, basi flavi, metalis flavi. (Corp. long. lin. $1\frac{1}{4}$; alar. lin. $1\frac{3}{4}$.)

Var. β.—Abdomen cyaneum, apicem versus minime cupreo-varium.

Var. γ.—Læte cyaneo-viridis: antennæ piceæ; articuli 1us et 2us virides: abdomen æneo-varium; protarsi fusci: proalis nervi fulvi.

Var. δ.—Abdomen læte cyaneum, basi viridi-æneum.

May, June; near London, Hampshire, Isle of Wight, Scotland.

Fem. Corpus angustum, nitens, scitissime squameum, parce hirtum: caput mediocre, transversum, breve, convexum, thorace fere latius, vertex latus; frons impressa, abrupte declivis: oculi mediocres: antennæ graciles, extrorsum crassiores, corporis dimidio longiores; articulus 1us longifusiformis, validus; 2us longicyathiformis; 3us et sequentes longi, sublineares, usque ad 5um paullulum curtantes et latescentes; clava fusiformis, articulo 5° paullo latior et multo longior: thorax longiovatus, parum convexus: prothorax transversus, parvus, supra conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum obconicum: metathorax mediocris: petiolus brevissimus: abdomen fusiforme, supra planum, subtus carinatum, apice attenuatum et acuminatum, thorace paullo longius et latius; segmentum 1um magnum; 2um et sequentia transversa, brevia: pedes graciles, simplices, subæquales; tarsis articulus 1^{u} 2° brevior, 3us 1^{i}

longitudine, 4us 3° longior; ungues et pulvilli mediocres: alæ angustæ; nervus ulnaris humerali paullo longior, radialis brevissimus, cubitalis sat longus, apice stigma fingens, parvum subfurcatum.

Sp. 39. Cirr. Orithyia, Fem. *Æneo-cupreus viridi-varius, antennæ piceæ, pedes flavi, alæ fulvescentes.*

Cupreo-æneus: oculi et ocelli rufi: antennæ piceæ; articulus 1us nigro-æneus, subtus et basi fulvus: abdomen viridi-cupreum: oviductus pallide rufus: pedes flavi; coxæ virides; tarsi apice fusci; protarsi pallide fusci: alæ fulvescentes; squamulæ fulvæ; nervi fulvi. (Corp. long. lin. $1\frac{1}{4}$—$1\frac{1}{2}$; alar. lin. $1\frac{3}{4}$—2.)

Var. β.—Viridis: abdominis discus cupreus.

Var. γ.—Caput viride: thorax viridi-æneus; discus cupreus.

June, September; near London, Isle of Wight. Near Belfast, Ireland, Mr. Haliday.

Mas. Corpus robustum, nitens, pubescens, scite squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: vertex latus; frons abrupte declivis: oculi mediocres, non extantes: antennæ filiformes, hirtæ, corpore breviores; articulus 1us sublinearis: 2us longicyathiformis; 3us et sequentes ad 6um longi, lineares, subæquales; clava fusiformis, longissima, acuminata, articulo 6° plus duplo longior: thorax ovatus, crassus, convexus: prothorax transversus, brevissimus, supra conspicuus: mesothoracis scutum foveolatum, latitudine vix longius; parapsidum suturæ bene determinatæ; scutellum obconicum, bifoveolatum; paraptera et epimera conspicua: metathorax mediocris: petiolus crassus brevissimus: abdomen sublineare, planum, thorace angustius et paullo brevius; segmentum 1um maximum; 2um et sequentia breviora, transversa: sexualia exerta: pedes mediocres: alæ non ciliatæ; nervus ulnaris humerali longior, radialis nullus, cubitalis longus, in alæ discum declivis.

Fem. Caput thorace vix angustius: antennæ extrorsum crassiores; articuli 3us et sequentes longi, lineares, ad 5um curtantes; clava fusiformis, acuminata, articulo 5° fere duplo longior: abdomen longiovatum, acuminatum, subtus carinatum, thorace fere longius non latius.

Sp. 40. Cirr. Tachos, Mas et Fem. *Viridis, antennæ piceæ, pedes flavi, femora viridia, alæ limpidæ.*

Mas. Cyaneo-viridis: oculi et ocelli rufi: antennæ piceæ; articuli 1us et 2us atri: abdomen cyaneo-viride; discus purpureo-cyaneus: sexualia fulva; pedes fulvi; coxæ nigro-virides; femora nigro-viridia: tarsi flavi, apice fusci; protarsi fulvi: alæ limpidæ; squamulæ virides, proalis nervi fulvi, metalis flavi.

Fem. Nigro-viridis: abdomen viridi-æneum; discus nigro-cupreus. (Corp. long. lin. 1—$1\frac{1}{4}$; alar. lin. $1\frac{1}{2}$—$1\frac{3}{4}$.)

Mas. Corpus robustum, nitens, pubescens, scite squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum; vertex latus; frons abrupte declivis: oculi mediocres, non extantes: antennæ filiformes, hirtæ, corpore breviores; articulus 1us sublinearis; 2us longicyathiformis;

3us et sequentes ad 6um longi, lineares, subæquales; clava fusiformis, longissima, acuminata, articulo 6° plus duplo longior: thorax ovatus, crassus, convexus: prothorax transversus, brevissimus, supra conspicuus: mesothoracis scutum foveolatum, latitudine vix longius; parapsidum suturæ bene determinatæ; scutellum obconicum, bifoveolatum; paraptera et epimera conspicua: metathorax mediocris: petiolus crassus, brevissimus: abdomen sublineare, planum, thorace angustius et paullo brevius; segmentum 1um maximum; 2um et sequentia breviora, transversa: sexualia exerta: pedes mediocres, subæquales; tarsis articuli 1us et 3us breviores, 2us et 4us longiores; ungues et pulvilli parvi: alæ mediocres, non ciliatæ; nervus ulnaris humerali longior, radialis nullus, cubitalis longius in alæ discum declivis, apice stigma fingens, bimucronatum.

Fem. Caput thorace vix angustius: antennæ extrorsum crassiores; articuli 3° ad 5um curtantes; clava fusiformis, acuminata, articulo 5° fere duplo longior: abdomen ovatum, thorace brevius et angustius; segmenta transversa, 1um magnum, 2um et sequentia breviora.

Sp. 41. Cirr. Attalus, Mas et Fem. *Viridis* mas. *aut æneus* fem., *abdomen cupreum, antennæ nigræ, pedes flavi, femora nigra, tibiæ fusco cinctæ, alæ limpidæ.*

Mas. Nigro-viridis: oculi et ocelli rufi: antennæ nigræ; articuli 1us et 2us nigro-virides: abdomen nigro-cupreum, basi cupreo-viride: sexualia fusca: pedes fulvi; coxæ virides; femora nigra, apice flava; tarsi flavi, apice fusci; metatibiæ basi fuscæ: protarsi pallide fusci: alæ limpidæ: squamulæ piceæ; nervi fusci.

Fem. Cupreo-æneus: caput viride cupreo-varium: antennis articuli 1us et 2us picei, hic apice et ille subtus basique ferruginei: abdomen viridi-cupreum: alis nervi fulvi, basi fusci. (Corp. long. lin. $\frac{3}{4}$—1; alar. lin. $1\frac{1}{4}$—$1\frac{1}{2}$.)

Var. β. *Mas.*—Metatibiæ omnino fulvæ.

Var. γ. *Mas.*—*Var.* β. similis: protarsi fulvi, apice fusci.

Var. δ. *Mas.*—Mesothoracis scutellum viridi-cupreum.

Var. ε. *Mas.*—Mesotibiæ pallide fuscæ, apice et basi fulvæ; metatibiæ fuscæ.

Var. ζ. *Mas.*—Abdomen basi viridi-cyaneum: protibiæ obscure fuscæ; meso- et meta-tibiæ piceæ.

Var. η. *Fem.*—Antennis articuli 1us et 2us omnino nigro-virides.

Var. θ. *Fem.*—Thorax obscure æneo-viridis.

Var. ι. *Fem.*—Abdomen viride, basi læte viridi-cupreum.

Var. κ. *Fem.*—Thorax viridis.

Var. λ. *Fem.*—*Var.* κ. similis: metatibiæ omnino fulvæ.

June; near London, Isle of Wight. Ireland, Mr. Haliday.

Sp. 42. Cirr. Agathocles, Mas et Fem. *Cyaneus aut viridis, abdomen cupreum, antennæ nigræ aut piceæ, pedes nigri, tarsi flavi, alæ limpidæ.*

Mas. Cyaneo-ater: oculi et ocelli rufi: antennæ piceæ; articuli 1us et

2us nigri: abdomen nigro-cupreum: sexualia fusca: pedes nigri; trochanteres picei; genua flava; tarsi flavi, apice fusci; propedum tibiæ piceæ, apice fulvæ, tarsi fulvi: alæ limpidæ; squamulæ piceæ; proalis nervi fusci metalis flavi.

Fem. Atro-viridis: abdomen nigro-viride, cupreo-varium: pedes nigri; trochanteres picei; genua fulva; tibiæ piceæ; tarsi flavi, apice fusci; protibiæ fulvæ; protarsi fulvi: alis nervi fulvi. (Corp. long. lin. $\frac{3}{4}$; alar. lin. $1\frac{1}{4}$.)

Var. β. Mas.—Nigro-cyaneus: antennæ nigræ; articuli 1us et 2us nigro-cyanei: abdomen nigro-cupreum: pedes nigri; trochanteres fulvi; genua fulva; tarsi flavi, apice fusci; protarsi fulvi.

Var. γ. Mas.—Protibiæ fulvæ; meso- et metatibiæ piceæ.

Var. δ. Mas.—Var. γ. similis: protibiæ basi et apice flavæ.

Var. ε. Fem.—Cyaneo-viridis; antennæ nigræ; articuli 1us et 2us atri: abdomen cupreum, viridi-varium: pedes picei; coxæ nigræ; trochanteres fulvi; femora nigra; genua fulva; tarsi flavi, apice fusci; propedum tibiæ fulvæ, tarsi fusci: proalis nervi flavi.

Var. ζ. Fem.—Propedum tibiæ piceæ, tarsi apice fusci.

July; near London.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum; vertex latus; frons abrupte declivis, non impressa: oculi mediocres, subrotundi, non extantes: antennæ filiformes, non ciliatæ, corpore paullo breviores; articulus 1us validus, fusiformis; 2us longicyathiformis; 3us et sequentes ad 6um lineares, subæquales; clava fusiformis, acuminata, articulo 6° fere duplo longior: thorax ovatus, convexus: prothorax transversus, brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius, dorso foveolatum; parapsidum suturæ remotæ, conspicuæ; scutellum obconicum, bifoveolatum; paraptera et epimera bene determinata: metathorax mediocris: petiolus brevis, crassus: abdomen ovatum, planum, thorace angustius et brevius; segmenta parallela, 1um magnum, 2um et sequentia breviora subæqualia: sexualia exerta: pedes mediocres, simplices, subæquales; tarsis articuli 1us et 3us breviores, 2us et 4us longiores; ungues et pulvilli parvi: proalæ latæ, non ciliatæ; nervus ulnaris humerali non brevior, radialis nullus, cubitalis sat longus in alæ discum declivis, apice stigma fingens, minutum bimucronatum.

Fem. Antennæ extrorsum crassiores, corporis dimidio longiores; articuli 3° ad 5um curtantes; clava attenuata: abdomen breviovatum, supra planum, subtus carinatum, apice acuminatum, thorace brevius et fere latius.

Sp. 43. Cirr. Julis, Mas et Fem. *Cyaneus, antennæ nigræ, pedes cyanei, tibiæ piceæ aut fuscæ, tarsi pallidiores, alæ limpidæ.*

Mas. Cyaneus: oculi et ocelli obscure rufi: antennæ nigræ; articuli 1us et 2us nigro-cyanei: abdomen basi cyaneo-æneum: sexualia fulva: pedes fulvi; coxæ cyaneæ; femora cyanea; tibiæ piceæ; tarsi apice fusci; propedum tibiæ fulvæ, tarsi fusci: alæ limpidæ; squamulæ fulvæ; proalis nervi fulvi, metalis flavi.

Fem. Abdomen cyaneo-viride; discus læte purpureo-cyaneus. (Corp. long. lin. $\frac{3}{4}$—$1\frac{1}{4}$; alar. lin. 1—$1\frac{1}{2}$.)

Var. β. *Fem.*—Thoracis latera cyaneo-viridia: abdominis discus cupreus: pedes cyanei; trochanteres picei; genua flava; tibiæ fuscæ; tarsi fusci, basi flavi; protibiæ piceæ: proalis nervi fusci.

May; near London.

Fem. Corpus breve, crassum, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum; vertex latus; frons abrupte declivis, non impressa: oculi mediocres: antennæ sublineares, validæ, corporis dimidio longiores; articulus 1us sublinearis; 2us longifusiformis; 3us, 4us et 5us longiovati, subæquales; clava fusiformis, acuminata, articulo 5° fere duplo longior: thorax ovatus, valde convexus: prothorax transversus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ remotæ, bene determinatæ; scutellum obconicum, bifoveolatum: metathorax mediocris: petiolus brevissimus: abdomen ovatum, planum, thorace brevius, subtus carinatum, apice acuminatum; segmentum 1um magnum, 2um et sequentia breviora, transversa: pedes validi; tarsis articulus 1us 2° brevior, 2us 3° longior, 4us 2° longior; ungues et pulvilli parvi: alæ latæ; nervus ulnaris humerali non brevior, radialis nullus, cubitalis sat longus.

Sp. 44. Cirr. Ilithyia, Fem. *Cyaneo-viridis, antennæ nigræ, pedes fusci, femora viridia, alæ sublimpidæ.*

Obscure cyaneo-viridis: oculi et ocelli rufi: antennæ nigræ; articuli 1us et 2us nigro-virides: abdomen læte viride, apice supra cyaneum; pedes virides; trochanteres fusci; genua fulva; tibiæ fuscæ; tarsi fusci, basi fulvi: alæ sublimpidæ; squamulæ piceo-virides; nervi fusci. (Corp. long. lin. 1; alar. lin. $1\frac{1}{2}$.)

Scotland.

Mas. Corpus robustum, nitens, pubescens, scite squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ filiformes, hirtæ, corpore breviores: articulus 1us fusiformis; 2us longicyathiformis; 3us et sequentes longi, lineares, subæquales; clava fusiformis, acuminata, articulo 6° duplo longior: thorax ovatus, crassus, convexus: prothorax transversus, brevissimus, supra conspicuus: mesothoracis scutum foveolatum, latitudine vix longius; parapsidum suturæ bene determinatæ; scutellum obconicum, bifoveolatum; paraptera et epimera conspicua: metathorax mediocris: petiolus crassus, brevissimus: abdomen sublineare, planum, thorace angustius et paullo brevius: pedes mediocres: alæ non ciliatæ; nervus ulnaris humerali longior, radialis nullus, cubitalis longus in alæ discum declivis.

[To be continued.]

XLII.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 214.]

SAXIFRAGACEÆ, *DC.* (*Escallonicæ, sp. R. Br.*)

1. Quintinia, *Alph. De Cand.*

Calycis tubus ovario adhærens, nervis 10 subnotatus: limbus 5-dentatus, persistens. *Petala* 5-obovata. *Stamina* 5, patentia, petalis alterna. *Stylus* columnari-filiformis. *Stigma* peltato-capitatum, 4—5-lobum. *Capsula* stylo calycinisque dentibus coronata, 5-locularis, dissepimentis subincompletis, loculis polyspermis. *Semina* parva, ovato-compressa.—Arbores 20-30 *pedales.* Folia *alterna, petiolata, coriacea, integra seu serrata.* Flores *spicati, vel paniculati, albi.*

515. *Q. serrata*; foliis ovato-lanceolatis lanceolatisve acuminatis undulatis serratis supra farinoso-squamatis, subtus punctatis fuscatis, spicis axillaribus ramosis multifloris folio brevioribus. *A. C. Ms.*

New Zealand (Northern Island). Forests at the sources of the Kana-Kana river and elsewhere, on the shores of the Bay of Islands, flowering in November.—1826, *A. Cunningham.*

*Obs.** *Arbor* sempervirens, elegans, ramosa, 20-30 pedalis. *Rami* alterni, teretes, glabri. *Folia* alterna, breve petiolata, coriacea, 3—4 pollices longa.

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* The type of this genus, a native of New South Wales, may be thus characterized:—

Q. Sieberi (melius *integrifolia*), foliis ovato-acuminatis coriaceis venosis integerrimis glabris subtus discoloribus, paniculis terminalibus ramosis, ramis patentibus. *Alph. De Cand. in Monogr. Campan.* (1830), *p.* 92. *DC. Prodr.* iv. *p.* 5.—Ericineis Campanulaceisve affinis. *Sieb. Pl. Sic. Nov. Holl., p.* 261.

Hab. In Nova Cambria Australi, in sylvis densis humidis prope littora.—1834, *R. Brown.*—1818, *A. Cunningham.*

A remarkable tree, assuming occasionally (like some *Fici*) of equinoctial countries) a parasitical growth, as will appear from the following memorandum, made some years ago in one of its native forests. It may be premised, that in the centre of the Blue Mountain chain, directly west from Port Jackson, is a remarkable eminence, called Tomah, the height of which, above the level of the ocean, has been ascertained to exceed 3500 feet. Before the axe of the colonist was carried to the base of that mountain, in the great chain, viz. prior to 1823, Tomah had its flanks and summits clothed with a dense vegetation, consisting of timber trees, loving shade and moisture, laden with orchideous Epiphytes, and borne down heavily by gigantic climbers; and beneath them, in deep shade, flourished many a noble specimen of an arborescent fern (the *Cibotium Billardieri* of Kaulfuss), which was not previously known to exist in New South Wales. On the side of the mountain was then to be observed a remarkable instance of the disposition of the *Quintinia* to attach itself to other plants by means of cauline roots, that may be worthy notice.

A large *Quintinia* (*Sieberi*, A. DC.) grew near to an aged *Cibotium*, full 35 feet high, and having a distinct trunk in the soil. At about 6 feet

2. Weinmannia, *L.*

516. *W. betulina*, foliis ternatis impari-pinnatisque : foliolis obovatis coriaceis obtusis basi angustatis crenato-serratis venosis, rachi ramulis pedunculisque pubescentibus, racemis terminalibus multifloris, petalis obovatis obtusis calyce paulo longioribus.

New Zealand (Northern Island). Damp woods on the east coast.—1826, *A. Cunningham.*

Obs. Arbor (sempervirens) triginta pedalis. *Foliola* coriacea. *Racemi* 2—4 pollicares, confertiflori. *Capsula* ovata, acuminata, pube adpressa raro conspersa. *Semina* apice penicillata.

517. *W. fuchsioides*, foliis simplicibus ternatisve ovato-oblongis acuminatis coriaceis reticulato-venosis serratis basi attenuatis longe petiolatis subtus discoloribus, petiolis ramulisque pubescentibus, racemis terminalibus multifloris folio duplo triplove longioribus, sepalis lanceolatis, petalis lato-ovatis obtusis calyce longioribus, ovariis villosis, stylis stamina æquantibus.

New Zealand (Northern Island). Shaded forests, margins of woods, &c., Bay of Islands.—1826, *A. Cunningham.*—1831, *R. Cunningham.*

Obs. Arbuscula ramosa. *Folia* sesqui v. 2-pollices longa, basi angustata, crenato-serrata, subtus rubro-venosa ut in *Fuchsia*. *Racemi* densiflori, 4—5 unciales. *Pedunculi* pubescentes. *Capsulæ* subrotundæ, costatæ, pilis tenuissimis patentibus conspersæ. Semina basi apiceque barbata.

518. *W. sylvicola* (Sol.), foliis ternatis impari-pinnatisve : foliolis ellipticis acuminatis obtusiusculisve coriaceis petiolatis basi attenuatis crenato-serratis utrinque glabris, racemis elongatis densifloris folio plus duplo longioribus, fasciculis subverticellatis 4—6-floris, ramulis pedunculisque pubigeris. *Sol. Mss. in Bibl. Banks.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Dry woods in the country intermediate to Hokianga and the Bay of Islands.—1826, *A. Cunningham.*

Obs. Arbuscula 15—20 pedalis. *Foliola* crassa, ovalia, obtusa, subtus

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from the ground, however, the roots which the former had thrown out from its stem had got hold of the fern tree, the caudex of which they enveloped by numerous folds, so as to present but one trunk of great bulk for upwards of 20 feet. Above this, however, was to be perceived the rough bark of the *Quintinia* on one side, and the rugged caudex of the fern on the other, the trunks of both continuing firmly united, as if grafted into each other, until near their summits, where they separated; the *Quintinia* exhibiting a branching umbrageous head, while the *Cibotium* spread forth its noble tufts of fronds, evidently not in the slightest degree inconvenienced by the embrace of the aerial roots of the other, throughout nearly its whole length of caudex.

It may here be added, that all the specimens of *Cibotium*, examined at that period on the Tomah mountain, had young seedlings of the *Quintinia* growing on their trunks, upon which, being well rooted, they assumed all the habit and aspect of some kinds of wild fig in intratropical regions, that live and grow as well without earth, in the hollow branch or trunk of a tree, as they do when they happen to fall to the ground and there take root. (Memorandum 2nd Dec. 1823. A. C.)

venosa. *Racemi* copiosi, interdum bini, spicati, tripollicares. *Stamina* exserta, subæqualia. *Pedicelli* floribus longiores. *Capsula* ovata, villosiuscula, costata. *Discus hypogynus* 8-glandulosus. *Seminum* structura mihi ignota.

3. Leiospermum, *Don.*

(*Weinmanniæ sp. L. Forst.*)

Calyx 4-fidus, deciduus. *Petala* 4. *Stamina* 8. *Discus hypogynus* planus, integer. *Capsula* ab apice septicido-dehiscens: loculis polyspermis. *Semina* minuta, oblonga, glabra.—Arbores *sempervirentes* (*Novæ Zelandiæ et Tahitensis*). Folia *simplicia, impari-pinnataque, serrata.* Stipulæ *caducæ.* Flores *racemosi.*

519. *L. racemosa*, petiolis apice articulatis, racemis subsolitariis. *Don. in Edinb. New Phil. Journ.* (*June* 1830) *p.* 8.—Weinmannia racemosa. *L. Forst. Prodr. n.* 173. *Willd. Sp. Pl.* 2. p. 438. *DC. Prodr.* iv. *p.* 8. *A. Rich. Fl. Nov. Zel. p.* 321.—W. speciosa. *Banks and Sol. Mss. in Bibl. Banks.*

Towai, incol., *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* In shaded woods and on the margins of running steams near the Bay of Islands.—1826, *A. Cunningham.* (Middle Island).—1773, *G. Forster.* Astrolabe Harbour.—1827, *D'Urville.*

Obs. Arbor robusta, triginta vel quadriginta pedalis. *Folia* lato-elliptica, vel elliptico-oblonga, subtus pulchre venulosa, 2—3-pollicaria. *Racemi* terminales, plerumque bini, 3—4-unciales.

In Mr. Don's monograph of this family the author gives New Zealand as the locality of *L. parviflorum*, on the authority of Forster. Having, however, examined a specimen of that rare plant in the Banksian Herbarium, where Tahiti alone is marked as its native country, it appears evident that it is a mistake of this learned writer, occasioned possibly by his having just previously described the type of the genus, which both Sir Jos. Banks and Forster found in great abundance in New Zealand. *Weinmannia parviflora* of Forster has been found only in the forests of Tahiti.

4. Ackama.

Calyx 5-partitus, persistens; laciniis lineari-spathulatis. *Petala* 5, integra, decidua. *Stamina* 10, æqualia. *Discus hypogynus* subcrateriformis, dentatus, seu 10-glandulosus. *Capsula* ab apice septicido-dehiscens, loculis polyspermis. *Semina* minuta, ovata, rostrata, testa spadicea: coriacea, glabra.

The name of this distinct genus has been invented by anagrammizing that given to the tree by the natives.

520. *A. rosæfolia.*—Weinmannia rosæfolia. *A. C. Mss.* 1826.

New Zealand (Northern Island). In shaded woods near the Hokianga river, where it usually flowers in September.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

Maka-maka, insul. *R. Cunningham.*

Obs. Arbor 30-pedalis. *Ramuli* dense cinereo-pilosi. *Folia* pinnata: foliola 4—6-juga cum impari, sesqui vel biuncialia, elliptica, acuta, serrata (serraturis attenuatis), breve petiolata, glabra, subtus discolorata, penninervia attamen pilosa. *Flores* terminales, paniculati, paniculis ramosis, laxis, dense lanatis, pilis stellatis. *Petala* lineari-spathulata, segmentis calycis æqualia. *Stamina* incumbentia. *Styli* divaricati. *Ovarium* copiose tomentosum. *Capsula* subrotunda, ecostata, strigosa.

CRASSULACEÆ, *DC.*

TILLÆA, *Mich. L.*

521. *T. verticillaris*; caule basi prostrato radicante, ramis adscendentibus, foliis oppositis oblongo-linearibus, floribus quadrifidis ad axillas congesto-verticillatis, aliis sessilibus (immaturis?), aliis pedicellatis. *DC. Prodr.* iii. *p.* 382. *Endl. Syn. Fl. Insul. Oc. Austr. in Ann. des Wien. Mus. Band* i. *p.* 177.—T. muscosa. *Forst. Prodr. n.* 61. *A. Rich. Fl. Nov. Zel. p.* 322, *non Linn. conf. Endl.*

New Zealand (Middle Island).—1773, *G. Forster.*

FICOIDEÆ, *Juss.*

1. MESEMBRYANTHEMUM, *L.*

522. *M. australe. Soland. in Hort. Kew. ed.* 1. *vol.* ii. p. 187. *Willd. Sp. Pl.* ii. *p.* 1047. *Haw. Misc. Nat. p.* 79. *DC. Prodr.* iii. p. 428. *Endl. Prodr. Fl. Norf. p.* 72.

New Zealand (Northern Island).—1769, *Sir Jos. Banks, H. K. loc. cit.*

Obs. Caulis semiteres, glaber, prostratus. *Folia* triquetra, glaucescentia, punctulata, lævia, incurvantia. *Pedunculus* obtuse anceps, basi bibracteatus. *Flores* mediocres, dilute rubicundi. *Calyx* 5-fidus. *Stigmata* 5, subulata.

2. TETRAGONIA, *L.*

523. *T. expansa. Soland. in Hort. Kew. ed.* 1. *vol.* ii. *p.* 178. *Willd. Sp. Pl.* ii. *p.* 1024. *DC. Prodr.* iii. *p.* 452. *Endl. Prodr. Fl. Norf. p.* 72. *A. Rich. p.* 320. *Plant. Crass. t.* 114.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.*

New Zealand Spinach.

PASSIFLOREÆ, *Juss.*

PASSIFLORA, *L.* (*Granadilla Tournef.*)

524. *P. tetrandra*; glabra, foliis ovali-oblongis acuminatis integerrimis eglandulosis. *DC. Prodr.* iii. *p.* 323. *Banks et Sol. Mss. in Bibl. Banks.*

Ku-papa, incol. *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Near the Waimaté and on the margins of forests at the head of Kana-Kana river, Bay of Islands.—1833, *R. Cunningham.*

Obs. Pedunculi ramosi, triflori. *Calyx* 4-lobus. *Stamina* 4. *Involucrum* nullum, aut minimum. *Flores* parvi, virescentes.

CUCURBITACEÆ, *Juss.*

SICYOS, *L.*

525. *S. australis*, foliis cordato-reniformibus angulatis denticulatis scabri-

usculis, cirrhis trifidis, pedunculis masculis corymboso-racemosis, elongatis, femineis brevibus glomerato-capitatis, fructibus ovatis, echinatis, semine ovato basi acuto, apice obtusiusculo. *Endl. Prodr. Fl. Norf. p.* 67.—S. angulata. *Forst. Pr. n.* 368. *A. Rich. Fl. Nov. Zel.* p. 323, *non Linn. Icon Bauer ined. t.* 110.

Pohue, incol., *R. C.*

New Zealand (Middle Island).—1773, *G. Forster* (Northern Island). Among underwood on the sea coast, Wangaroa, &c.—1833, *Rich. Cunningham.*

[To be continued.]

XLIII.—*Information respecting Botanical Travellers.*

Unio Itineraria.

Extract from Dr. Steudel's Letter, dated Aug. 24, 1838.

The general accounts which we continue to receive respecting M. Schimper's travels in Abyssinia are very satisfactory, although the letters with which this naturalist favours us are mostly short and not so full of detail as we could desire.

Since the announcement, given by us in January last, of M. Schimper's proceedings, we have received tidings which bring down our information to the end of March, at which period he was in good health, and, together with the most favourable prognostications as to the ultimate success of his journey, he had already augmented his collection to the number of 50,000 dried specimens of plants, consisting of about 600 distinct species, many of which were new. Difficulties had recently threatened to put a stop to M. Schimper's progress. The Abyssinian priests had succeeded by their intrigues in obtaining an order from the reigning powers for the expulsion of the missionaries, hitherto so favourably received in that country, and this mandate was also to extend to every European. Our traveller having received due intimation of this measure, forthwith applied by a suitable memorial to Prince Ubie, whose patronage he particularly enjoyed, and earnestly petitioned for leave to remain in the country under the prince's special protection. This request, backed by the present of a handsome double-barrelled gun, produced the desired effect; so that M. Schimper, if he be only provided with the needful pecuniary assistance, entertains no doubt of fully accomplishing the object of his journey. In his last letter he computes that he has hardly collected one tenth of the rich Flora of Abyssinia, and that two years will probably be required to complete the collection.

Dr. Steudel is of opinion that in case the specimens already obtained reached Europe in safety, the sale of them will cover all the expenses already incurred; and as the most difficult part of the undertaking may be considered as overcome, the risk which subscribers might have to run is very materially diminished.

In September 1838, the following additional information was printed in German and circulated among the friends of the *Unio Itineraria.*

The travels of M. Schimper in Abyssinia are still prosecuted. The collections which he has made in that country, consisting chiefly of dried plants, were deposited at the date of his last letter (April 1838) in fifteen chests, and were lying at Adoa, the place of his temporary sojourn. The choice was offered him, whether to proceed to Europe, carrying his collections with him, or to remain in Abyssinia with the object of exploring the high mountainous country of Semea and the valleys of Schoho. In the latter case, he must leave the treasures that he had already amassed in Adoa, as the heavy charges attendant on their despatch to Massava on the Red Sea and thence to Egypt would exhaust all his funds, and forbid his prosecuting the aforesaid researches in Abyssinia. His decision has been to pursue his way to those districts, hitherto unexplored, which lie under the special jurisdiction of Prince Ubie; and this great chief, mollified by petitions and presents, exempts M. Schimper from the decree of banishment recently passed against all Europeans, and which hastened from Adoa the missionaries Blumhardt and Isenberg, with whom our traveller had been residing there, and who had shown him much kindness. These estimable individuals confirm to the fullest extent the statement that Schimper has sent us respecting the value of his collections, and also speak most highly of his exertions. Hitherto, M. Schimper's labours have been confined to the moderately elevated ground that lies about Adoa; but if he can also investigate the high mountain ranges, a most interesting epoch will take place in the annals of botanical research with respect to Abyssinia. This consideration and the desire to perfect his labours induced M. Schimper to expose himself to new fatigues and dangers, through which we hope that his previous experience and the sound constitution that he possesses will enable him to pass unharmed.

The most essential requisite is now that the traveller should be furnished with fresh remittances, so that on his return from the journey in hand, he may be enabled to incur the expense of despatching his collections. The removal of these numerous packages and the permission to forward them over a considerable extent of coun-

try must be obtained by making numerous presents to Prince Ubie and his subaltern officers, petty chieftains, &c. The cost of travelling with goods to the Red Sea is likewise very heavy. Some little provision has been already made, according to our former request, to meet these expenses; and here we beg to tender our thanks for the promptitude with which many of the members of the *Unio* have come forward, so that (including a contribution from our Government to the amount of 300 florins) we have already been enabled to devote 6000 florins to the object of this journey. About 2000 florins more will probably be required, and we therefore particularly look to those members of the *Unio* who have as yet contributed nothing on this occasion, or only subscribed the simple and customary sum of 30 florins, and earnestly request that they will now come forward with contributions of money. Such friends of botany and well-wishers to our cause as have not yet been connected with this institution, we beg to inform that by subscriptions of 30, 60, 90, 120, and 130 Rhenish florins (65, 130, 195, 260, and 300 francs) they may look to receive (if no peculiar disaster occurs) respectively 200, 400, 600, 800 and 1200 species of dried plants from Abyssinia, or other natural productions, for details respecting which we must refer them to our printed appeal of January of this year. The many novelties that rewarded Schimper's journey in Arabia, particularly the province of Hedsches, entitle us to entertain high expectations from his labours in Abyssinia. We particularly recommend the subject of Schimper's journey to the attention of the friends of natural science who are to meet this month at Fribourg, and only regret that we cannot personally attend and urge the subject.

The present opportunity permits us to mention that some small collections remain unsold from the former journeys, viz.

1st. *Arabian Plants*, collections of 200 species at 30 florins (65 francs.)
——— 100 ——— 15 florins (33 francs.)
2nd. *N. American Plants*, (Ohio district) col. of 200 spe. at 24 fl. (50 fr.)
3rd. *Georgio-Caucasian Plants*, col. of 320 species at 40 florins (86 francs.)
——— 200 ——— 25 florins. This is the fifth delivery.

Lastly, we have undertaken the commission of disposing of collections made from the Flora of Portugal and the Azores this summer by MM. Guthrick and Hochsteller, jun., in the environs of Lisbon, (the greater part however at the Azores,) during a journey which these naturalists made at their own expense. Purchasers may have either complete collections of 200—300 species at 12 florins (25 fr.), or smaller ones of 100 to 150 species at 10 to 15 florins, the latter

it must be observed containing a beautiful suite of the Lisbon Flora, and a great number of rare and novel species; for instance, some undescribed *Carices*, a new *Laurus*, a new *Vaccinium*, a large-flowered new species of *Euphrasia*, an undescribed *Frankenia* and *Veronica*, together with several recent discoveries, the fruits of the Rev. Mr. Lowe's labours in Madeira. For these, subscriptions are received of from 10 to 36 florins (22 to 75 francs, which must be sent free of postage), and for which the collections will be transmitted early in the following year.

PROFESSOR HOCHSTETTER.
DR. STEUDEL.

Esslingen, Sept. 10, 1838.

We learn by letters lately received from Switzerland, that Dr. Brunner of Berne has returned from the Cape de Verd Islands with a collection of from 500 to 600 species of plants, which it is his intention to offer to botanists at the rate of about 2*l.* the hundred species.

Mr. Gardner is prosecuting his botanical researches in Brazil with unabated ardour. At p. 463 of vol. i. we mentioned his arrival at Pernambuco, and gave some account of the vegetation of that district, which he had communicated in a letter dated Jan. 24, 1838.

Since that period several letters have reached us from this enterprising naturalist (the last dated in July of this year), from which we extract the following passages.

"Maçeio, Province of Alagoas, April 5, 1838.

"I am highly gratified to hear that my collections from the Organ Mountains give so much satisfaction. After the labour bestowed on collecting and preserving them, this intelligence becomes doubly agreeable. It is peculiarly pleasant to me to know that the *Cactus* which I named after my noble and generous patron the Duke of Bedford is doing so well in the Glasgow Botanic Garden. It is a remarkably pretty species, and will soon, I trust, blossom with you; the specimen which I first saw, and of which the discovery gave me more delight than I can describe, was adorned with upwards of 200 flowers.

"Since I last wrote to you I have done and suffered a good deal, having been within an inch of the grave from a severe attack of dysentery while on a voyage up the Rio San Francisco. On the 30th of January I left Pernambuco in a canoe for this place, where I pur-

posed to spend two months, till the rainy season should set in, and then proceed into the interior. The Rio San Francisco being so near, I determined on visiting it, knowing that in these tropical countries the margins of rivers generally afford good botanizing. After collecting a few plants in the vicinity of this place, I embarked in a *Jangada* for Pebá, a village five leagues to the north of the mouth of the San Francisco river, the heavy surf which breaks on the bar not allowing small craft to approach nearer, and from thence made my way in a bullock cart to the village of Piassabussa, situated on the north bank of the river, and two leagues from its outlet. It was night when I arrived, but next morning I was highly delighted with the sight of that magnificent stream, then discharging, as usual at that season, its greatest quantity of water, and more swollen by the late rains than it has been since the year 1792. The flat country on both sides was inundated to a great extent, and hundreds of families obliged to quit their dwellings, which were either carried away or quite submerged. From Piassabussa I again embarked in a canoe for the Villa do Peñedo, situated five leagues higher up, and there I spent a few days in the house of the Juiz Derita, a very excellent kind man, a lover of science and particularly fond of botany, although he attends more to the theoretical than the practical part of it. My great wish was to reach the magnificent falls, nearly 200 miles nearer the source of the river, 60 miles of which must be travelled overland. Every one dissuaded me from the attempt, particularly at this season, when the ground is so much burned up that it is impossible to find grass and water for horses. Still I determined to proceed, and hired a canoe to convey me as far as the stream was navigable; and just as we had reached this point, 100 miles up, close to the Ilha do San Pedro, a large island in the river, a tremendous storm overtook us in the middle of the stream. Such a hurricane I never witnessed. Before we could reach the lee side of the river, there more than a league broad, our canoe had nearly upset, and would certainly have done so, when we must all have been drowned, but for the exertions of my black servant and myself, for the crew were so terrified as to lose all presence of mind, and they gave no assistance; and the night was dark, the river broad, and the current strong. The thunder and lightning and rain exceeded all I could imagine. Drenched to the skin we reached the shore, and remained till daybreak in our wet clothes, and the consequence to me was a severe attack of dysentery. For several days there was no prospect of my recovery, and more than once I attempted to write what I considered would be my last letters to Sir W. J. Hooker and

another friend, when my disease took a favourable turn, and I soon recovered sufficient strength to return to the Villa do Peñedo, where my kind friend the Juiz gave me a most welcome reception. His attentions accelerated my amendment, and I soon began to make considerable collections in the neighbourhood. In going up the river I had obtained many valuable things, chiefly *Leguminosæ* and *Loranthaceæ;* and on the Ilha San Pedro, where I remained during my illness, there were a great variety of fine *Cacti*, of which, spite of my great debility, I brought away three large cases. Some of the species attain a height of nearly thirty feet, and have stems three feet in circumference. A beautiful *Melocactus* particularly attracted my attention, and I trust the plants of it that I collected will do well. Many of the *Cacti* are no doubt new. I only found two species of *Orchideæ*. The island is chiefly inhabited by civilized Indians. It is my intention to take these collections to Pernambuco and ship them from thence; and I will at the same time give you a full account of my voyage and the vegetation of the country through which I passed. Since I came back I have visited the city of Alagoas, which is situated on the margin of a large lake, about six leagues from this place. I was much pleased to find there fine specimens of *Mayaca fluviatilis* (Aublet) and *Cabomba aquatica* of the same author.

"Any little information which my friends can communicate respecting the progress of science at home will be gratefully received by me. I trust that I may be allowed to receive regularly the numbers of the 'Companion to the Botanical Magazine,' for I assure you that it is really a '*companion*' to me in this lonely life, where

I wander forth alone, and find no kindred eye
To gaze with me on the flowery earth and the glory of the sky."

[Mr. Gardner's subsequent letters will appear in our next.]

BIBLIOGRAPHICAL NOTICES.

A Cornish Fauna, being a compendium of the Natural History of the County. Part I. Containing the Vertebrate, Crustacean, and a portion of the Radiate Animals. By Jonathan Couch, F.L.S., &c. 8vo. Truro, 1838.

This is another of those little works which are daily rendering the knowledge of our native Fauna more complete, while at the same time it serves as a guide to the collection belonging to the Scientific Institution of the district. Mr. Couch has long been known as an observing naturalist, and as particularly conversant with the ichthyology of the Cornish coasts, and in the short Fauna now before us we have

both many interesting remarks as "occasional correction of what is believed to be an error, or an addition of something in which our native species may differ from the same kinds in other districts," with the characters of several species which the author considers new, either to our Fauna or entirely so to science. The lists of the mammalia and birds are the most scanty, and we have little doubt that further research will soon add to their enlargement. The other departments are much fuller and exhibit a rich series. The following observations suggested themselves while perusing the work. Of the bats, six species are enumerated, though it is supposed more may exist. There will also be found additions to the *Sorices* and *Arvicolæ*. The *Cetacea* show a good list; thirteen species are enumerated. Speaking of the porpoise it is remarked, "I have known it take a bait, though it commonly proves too strong for the line." (We have more than once proposed to an angling friend to fish for this animal with the rod and line.) The falling motion in this and some of the others is accounted for "by the situation of the nostrils on the anterior part of the top of the head, to breathe through which, the body must be placed in somewhat of an erect posture, from which to descend, it passes through a considerable portion of a circle."

Among the birds the *Raptores* are comparatively rare. The *Noctua? funerea* as British, rests on the authority of a specimen taken on the Cornish coast. Of the *Insessores* the golden Oriole alights occasionally on the fishing boats. We regret to observe that the Cornish chough or red-legged crow is decreasing in numbers "owing to persecution from those who supply specimens to naturalists." The hoopoe is met with so frequently, "as to justify me in saying that it is not uncommon in Cornwall." Two instances of the alpine Swift having occurred are mentioned. *Natatores*: the little gull is stated to have been taken two or three times; and a new gull is given under the title of *L. Jacksonii*, Couch, for the characters of which see our Miscellanea, where we have printed them, as more likely there to attract attention. *Procellaria glacialis, Puffinus, Anglorum, cinerea, pelagica,* and *Leachii* are all given.

Among the reptiles we have the *Rana esculenta* introduced, but with some hesitation. There have been several notices of this species occurring both in England and Scotland, but without sufficient authenticity, and the subject is worthy of more strict inquiry.

Fishes. Here we have an ample list, and in it several additions and corrections to Mr. Yarrell's work, which that gentleman will doubtless use in his forthcoming supplement. The *Serranus Couchii*,

Yarr., is considered identical with *Polyprion cernuum*, Cuv. and Vall. *Hæmulon formosum* or squirrel fish, a native of the West Indian Seas, has been once taken. *Sciæna Aquila* has been taken twice. *Cyclopterus coronatus*, coronated Lump fish of Couch, and considered new to science—one specimen however has only been examined, of a very small size; see our Miscellanea for characters. At the conclusion of this list there are some important remarks on the time and œconomy of spawning of many of the fishes commercially used, together with some hints regarding the improvement of our fishing regulations. This is a much more important subject than most people are at present willing to suppose, and these remarks deserve attention.

Of the Crustaceous animals, fifty-four species are enumerated; five *Lepadea*, and of the Radiated animals, twenty-three. We trust the second part of this Fauna will speedily appear.

British Entomology. By J. Curtis, F.L.S.

Since we last noticed this work Nos. 175 to 180 have been published, which complete the 15th volume.

Lampyris noctiluca (the Glow-worm), *Rhagio Heyshami*, *Ephemera cognata* (the May-fly), *Harpocera Burmeisteri*, *Libellula rubicunda*, *Anthicus tibialis*, *Molanna angustata*, *Coccus Aceris*, and *Phytosus spinifer* are amongst the most interesting novelties, and there is a very beautiful plate of the rare *Clostera anachoreta* and its caterpillar. We would also call the attention of botanists to the faithful figures of *Astragalus hypoglottis*, *Sagittaria sagittifolia*, *Arabis stricta*, *Osmunda regalis*, *Althæa officinalis*, *Milium effusum*, *Hutchinsia petræa*, *Oxyria reniformis*, *Acorus Calamus*, *Zannichellia palustris*, *Melittis grandiflora*, &c.

We are happy to find that Mr. Curtis is preparing for the press a Synopsis of British Insects, the orders to be published in separate volumes. This will undoubtedly be an agreeable present to all lovers of entomology, especially those who have not ready access to large libraries.

Entomologists are earnestly invited to supply Mr. Curtis with duplicate specimens of those insects which he does not possess, or to lend him such species as maybe required for describing.

Icones Plantarum. By Sir W. J. Hooker.

The fifth part of this work, or the first half of the third volume, has recently appeared, with fifty plates, from Tabs. CCI. to CCL. inclusive. This portion is particularly rich in new South American plants from the collections of Mr. Gardner, Mathews, Professor W. Jameson, &c.

The same author has just completed the second part of Mr. Bauer's 'Illustrations of the Genera of Ferns'; and the seventh part of the 'Botany of Capt. Beechey's Voyage' will soon be ready. These two works, and the 'Flora Boreali-Americana,' of which Part X. is in a state of great forwardness, are published by H. G. Bohn, 4, York Street, Covent Garden.

We have just received the forty-seventh number of Mr. Sowerby's 'Supplement to English Botany.' It contains plates and descriptions of *Polygonum laxum*, Reich. and Borr. in Hook. Brit. Fl., ed. 4. note; *Lotus hispidus*, Loisel, which we have been disposed to consider as not specifically distinct from *L. angustissimus*, and it occurs in Jersey with that species; *Chara pulchella*, Wallr., "principally distinguished from *C. Hedwigii* by its more flexible stems and oblong nucules;" and *Tetraspora lubrica*, Agardh, and Hook. in E. Fl. 5. p. 313.

Tijdschrift voor Natuurlijke Geschiedenis en Physiologie; edited by Prof. J. Van der Hoeven and Prof. W. H. de Vriese, Leiden, 1837.

Part I and II.

These contain the following original articles, besides reviews and notices.

Some remarks on the northern Whale, *Balænoptera rostrata*. By W. Vrolik.—On the Sargasso or Gulf-weed. By F. A. W. Miquel. —Some remarks on the origin of the green colour and changes of form in the stem of plants. By Dr. J. Wttewaall.—Researches respecting the motion of leaves which do not originate from swellings. By M. Dassen.—[The principal results contained in this memoir have been noticed at p. 223. of this Journal.]—Additions to our knowledge of the simple eyes of articulated animals. By A. Brants. —Experiments on the action of poisons on plants. By F. A. W. Miquel.—On the cause of the brand in *Physalia*. By P. W. Korthals. —Some notices of G. R. Treviranus. By J. Van der Hoeven.

Part III. and IV. 1838.

Hints on the origin of monstrous births, and on the doctrine of misformations. By W. Vrolik.—Contributions to the natural history of man. By J. Van der Hoeven.—The vegetation of the Northern Nertherlands compared with that of the Prussian Rhine Provinces. By F. A.W. Miquel.—Contributions to the solution of the question, whether *Lemna arrhiza*, auct. be a permanent distinct species, or merely a development form of some other species of the same genus. By J. F. Hoffmann.—On the periodical secretion of blood from the generative organs in some domestic animals, especially in the cow,

and remarks on this phænomenon in reference to the human kind. By A. Numan.—Geological and mineralogical notices on the Island of Borneo. By L. Hörner.—On the covering of the stigma in the *Scævolaceæ* and *Goodeniaceæ*. By P. W. Korthals.—Remarks on the gigantic Salamander of Japan. By J. Van der Hoeven. [Noticed at p. 413.]—The biforines of Turpin, a new discovery in the crystallography of the vegetable kingdom. By W. H. De Vries.—On *Lepidosiren paradoxa*. By J. Van der Hoeven. [A notice of this reptile was inserted in our last number at p. 309.]—Novæ species *Cycadearum* Africæ Australis, quas descriptionibus et figuris illustravit W. H. De Vries.

Works in the Press.

Dr. Robert Wight, Surgeon H. E. I. C. service, is preparing for publication an 'Icones Plantarum Indiæ Orientalis,' or Figures of Indian Plants described in Wight and Arnott's 'Prodromus Floræ Peninsulæ Ind. Or.,' and in Wight's 'Illustrations of Indian Botany,' now in the course of publication in India. This is to appear at Madras in monthly numbers, each containing ten lithographed uncoloured quarto plates, for one rupee or about one shilling and ninepence sterling. The grand object of this work may be summed up in a few words:—To give to India (so far as the limited resources of a private individual will permit) that which England has so long enjoyed in Smith's English Botany, a standard botanical work of reference, by the publication of correct figures of as many Indian plants as the author can accomplish, and in the shortest possible time. To reduce the price and increase the rapidity of publication, there will be no letter-press descriptions, but a simple reference to the 'Prodromus' by numbering the plates uniform with the running numbers of that work, except when new plants are introduced; and for the descriptions then necessary no additional charge will be made. The first number was expected to appear on the 1st of July.

A History of the Fishes of Madeira. By the Rev. R. T. Lowe. With original figures from nature of all the species, by the Hon. C. E. C. Norton and Miss Young.

The materials for this undertaking are the result of several years' patient investigation and continued revisal on the spot. Several of the genera, and of the species more than one fourth part, are either new or have been hitherto imperfectly described. The figures will be all engraved and coloured by the same hands which, in co-operation with the author, have originally drawn them, a combination much in favour of their accuracy and correctness.

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY. June 21, 1838.

"On the action of light upon the colour of the River Sponge." By John Hogg, M.A., F.L.S., C.P.S., &c., Fellow of St. Peter's College, Cambridge. Communicated by Thomas Bell, Esq., F.R.S.

The author found that the green colour of the *Spongilla fluviatilis*, or river sponge, is acquired solely through the agency of light, and is lost when the sponge is removed from its influence. As this does not appear to be the case with *Actiniæ*, the *Hydra viridis*, or any other Polype, the author is disposed to consider this production as being nearer allied to the Algæ or Fungi, than to any tribe belonging to the animal kingdom*.

"On the Geometrical Forms of Turbinated and Discoid Shells." By the Rev. H. Moseley, Professor of Natural Philosophy and Astronomy in King's College, London. Communicated by Thomas Bell, Esq., F.R.S.

This paper is occupied by an investigation of certain mathematical principles which the author considers as governing the formation of turbinated and discoid shells. According to these views, all such shells may be conceived to be generated by the revolution about a fixed axis of the perimeter of a geometrical figure, which, remaining always similar to itself, increases continually its dimensions. The spiral lines which are observable on the opercula of certain classes of shells, taken in connexion with the well-known properties of the logarithmic or equiangular spiral, appear to have suggested the idea, that not only the boundary of the operculum, which measures the sectional expansion of a shell, but also the spiral lines, which in general are well marked both externally and internally in the shell itself, are curves of this nature.

From an examination of the spirals marked on opercula, it appears that the increase of their substance takes place on one margin only; the other margin still retaining the spiral form, and acquiring an increase of length by successive additions in the direction of the curve. As in the logarithmic spiral the distances of successive spires, measured on the same radius vector produced from the pole, from each other, are respectively in geometrical progression, if similar distances between the successive whorls on the opercula of shells be found to observe the same law, it will follow that these whorls must have a similar form; and that such is the case, the author shows by a

* [Mr. Gray arrived at the same conclusion, but on physiological grounds, some years since. See Zoological Journal, vol. i. p. 50.—EDIT.]

variety of numerical results obtained by careful measurements on three different opercula of shells of the order *Turbo*. That such is the law of nature in the formation of this class of shells is rendered probable by the instances adduced by the author, in which a conformity to this law is found to exist.

From the known properties of the logarithmic spiral the author concludes that the law of the geometrical description of turbinated shells is, that they are generated by the revolution about a fixed axis, (namely, the axis of the shell,) of a curve, which continually varies its dimensions according to the law, that each linear increment shall vary as the existing dimensions of the line of which it is the increment. If such be the law of nature, the whorls of the shell, as well as the spires on the operculum, must have the form of the logarithmic spiral; and that this is likewise the case is shown by the almost perfect accordance of numerical results, deduced from the property of that curve, with those deduced from a great variety of careful measurements made of the distances between successive whorls on radii vectores drawn on shells of the *Turbo duplicatus, Turbo phasianus, Buccinum subulatum,* and in a fine section of a *Nautilus pompilius*. The author further states that, besides the results given in the paper, a great number of measurements were similarly made upon other shells of the genera *Trochus, Strombus,* and *Murex,* all confirmatory of the law in question.

One of the interesting deductions which the author has derived from the prevalence of this law in the generation of the shells of a large class of mollusca, is that a distinction may be expected to arise with regard to the growth of land and of aquatic shells, the latter serving both as a habitation and as a float to the animal which forms it; and that, although the facility of varying its position at every period of its growth may remain the same, it is necessary that the enlargement of the capacity of the float should bear a constant ratio to the corresponding increment of its body; a ratio which always assigns a greater amount to the increment of the capacity of the shell than to the corresponding increment of the bulk of the animal.

Another conclusion deducible from the law of formation here considered is, that the growth of the animal corresponding to a given increment in the angle of the generating curve, will always be proportional to the bulk it has then attained; and if the physical vital energies of the animal be proportional to its actual bulk, its growth, in any given time, will be proportional to its growth up to that time. Hence the whole angle of revolution of the curve generating the shell will be proportional to the whole corresponding time of the

animal's growth; and therefore, the whole number of whorls and parts of whorls will, at any period, be proportional to its age.

The form of the molluscous animal remaining always similar to itself, the surface of the organ by which it deposits its shell will vary as the square of the linear dimensions; but as the deposition of its shell must vary as the cube of the same dimensions, there must be an increased functional activity of the organ, varying as the simple linear dimensions.

Since to each species of shell there must correspond a particular number expressing the ratio of the geometrical progression of the similar successive linear dimensions of the whorls; and since the constant angle of the particular logarithmic spiral, which is affected by that species of shell, is deducible from this number, the author considers that, connected as the form of the shell is with the circumstances of the animal's growth and the manner of its existence, this number, or the angle of the particular spiral, determinable as it is in each case by actual measurement, may be available for the purposes of classification, and may suggest relations by which, eventually, they may become linked with characteristic forms, and modes of molluscous existence.

The concluding portion of the paper contains a mathematical discussion of certain geometrical and mechanical elements of a conchoidal surface. These are, the extent of the surface itself; the volume contained by it; the centre of gravity of the surface, and also of the volume, in each case, when the generating figure revolves about a fixed axis without any other motion, and also when it has, besides this, a motion of translation in the direction of that axis; and, lastly, the angle of the spiral. The author states that his object in this inquiry is the application of these elements to a discussion of the hydraulic theory of shells. The constant angle of the spiral, which each particular species affects, being connected by a necessary relation with the œconomy of the material of the habitation of each, with its stability, and the condition of its buoyancy, it is therefore necessary to determine the value of this angle.

LINNÆAN SOCIETY.

Nov. 6, 1838.—Mr. Forster, V.P., in the Chair.

Read a letter from Mr. Jonathan Couch, F.L.S., giving an account of a single specimen of Wilson's Petrel (*Procellaria Wilsoni*) having been found dead in a field near Polperro in Cornwall, about the middle of August last, at a time when the stormy petrel (*P. pe-*

lagica) abounded on the coast, most probably driven thither by the state of the weather at that period. Mr. Couch had therefore no difficulty in instituting a comparison between it and a specimen of the common species in nearly equal condition, and the following is the result.

Weight of the stormy petrel 4 drams, 35 grains; of Wilson's petrel 5 drams, 2 scruples.

Length	6 inches	7 inches.
Spread of wings	11¼ —	16½ —
Wings extended beyond the tail	½ —	1½ —
With the legs extended, the toes extend short of the tail	1 line.	Beyond the tail ½ in. 2 lin.

The stormy petrel is feathered just to the basal joint; but in Wilson's petrel the feathers only approach within 4 lines of it. In the former the tarsus is in length 1 line short of an inch, in the latter 1 inch 4 lines, and equally slender with the former; and the hinder toe is so minute that it might escape any but attentive examination. In the bill the markings are more strongly defined, with the terminal hook longer and sharper. The prominence of the forehead is less than in the more common species. Colour of the head black, with a hoary tint, lighter on the throat. The back, belly, wings, and tail are ferruginous, lighter on the wing coverts; the rump white, and a little of the same at the vent. Tarsi and feet black, with a longitudinal stripe of sulphur-yellow, more of a golden at the borders or the web between each toe.

The stouter configuration of this species enabling better to escape the violence of a storm may be ascribed perhaps as a reason why it is not more often found on our coasts.

On examining the stomach of a stormy petrel Mr. Couch found about half an inch of a common tallow candle, of a size so disproportionate to the bill and gullet of the bird, that it seems wonderful how it could have been able to swallow it.

Read also Observations on the Cause of Ergot. By Mr. John Smith, A.L.S.

The nature and origin of the substance called ergot, which occurs in the spikes of rye and many other grasses, have been involved in much obscurity; and even that eminent Fungologist Professor Fries, appears to be entirely unacquainted with its real structure, the discovery of which is clearly due to the author of the present communication, who has shown that the ergot is a morbid condition of the albumen, occasioned by the attack of a minute parasitic fungus, the sporules of which he supposes to be conveyed to the ovulum along with the

pollen. Early one morning during the last autumn Mr. Smith's attention was attracted by observing several large drops of a brown-coloured fluid suspended from a spike of a species of *Elymus*, in which were several full-grown ergots, and others in a younger state. The fluid was viscid and had a saccharine flavour. On subjecting a portion of it to the microscope, it was found to be full of innumerable minute, oblong, transparent bodies, varying from the 3000th to the 7000th of an inch, and resembling the sporules of fungi, and slightly bent, having a somewhat indistinct spot at each end. On applying a drop of water to a full-grown ergot, multitudes of these bodies became disengaged from its surface, and issued from the cracks or longitudinal fissures which generally characterize the fully developed ergot. These bodies imparted to the water a milky appearance. He observed the same bodies on ergots of all ages and sizes, and on opening the unexpanded flowers of ergot-bearing spikes, they were met with in abundance on the different organs, especially on the anthers; for on cutting an anther and applying water, they were seen to float out along with the pollen. They were also observed on the ovarium, and in little clusters on the hairs and feathery stigmata. These bodies are found to accompany the ergot through all its stages, and are present even before the fecundation of the ovarium, at least before the discharge of the pollen, and consequently before there is any appearance of an ergot, they therefore cannot be the sporules, but must be the cellules of the minute fungus itself. On examining an ergot, the surface before being moistened presents under the microscope the appearance of a thin whitish-pruinose crust, which, on the application of moisture, speedily separates into myriads of the minute transparent cellules before mentioned. On viewing the ergot in the dry state under the microscope, the pruinose appearance of the crust will be found to arise from these bodies being united together longitudinally, forming slightly elevated spiculæ, but crowded underneath and forming a kind of crust. These cellules so united present the appearance of slender-jointed filaments, either simple or branched, in which state they occur likewise on the anthers. Mr. Smith regards these cellules as the articulations of a minute filamentous fungus which is developed in the early stage of the flower, and propagating itself by the separation of the joints and impregnating the soil or the perfect seeds of the grass, which on germination and subsequent development carry up some of the reproductive matter of the fungus, which again developes itself in the flower, in the manner that Mr. Francis Bauer has shown to take place in the propagation of the smut and grain-worms in wheat.

The Chairman announced to the Meeting that the late Nathaniel John Winch, Esq., of Newcastle-upon-Tyne, had bequeathed to the Society his entire Herbarium, consisting of upwards of 12,000 species of plants, together with his library of Natural History.

November 20.—Mr. Forster, V.P., in the Chair.

Read the Description of a new Genus of Plants belonging to the Natural Family *Bignoniaceæ*. By Professor Don, Libr. L.S.

The subject of this paper was collected by Capt. Sir James Edward Alexander, during a journey through the interior of Southern Africa to the western coast. The plant was discovered by that enterprising traveller in the open desert, called the Kei Kaap, in Great Namaqua Land, in 25° S. latitude and 17° E. longitude. It is a thorny bush, about six feet high, with small simple, hoary, wrinkled leaves and large white flowers. There can be no doubt that the plant belongs to the *Bignoniaceæ*, although in habit it bears a stronger resemblance to *Verbenaceæ*, especially to *Duranta* and *Gmelina*. In its spathaceous calyx and regular funnel-shaped corolla the genus comes near to *Spathodea*, but is abundantly distinguished from it by the cells of the anthers being parallel and connate from the middle upwards. On the specimen were two expanded flowers and a bud. The calyx in all three had six teeth, and both the expanded flowers had a six-cleft limb; one of these had seven stamens, and the other, as well as the bud, six, so that this last may be regarded as the normal number.

The following are the name and characters of this new genus.

Catophractes. *Calyx* spathaceus, hinc fissus, inde 6-dentatus. *Corolla* infundibuliformis: *limbo* 6-lobo, patenti, æquali. *Stamina* 6, raro 7, subæqualia, exserta. *Antherarum loculi* paralleli, e medio sursum connati. *Ovarium* abbreviatum, conicum, biloculare?

Frutex (namaquensis) *erectus spinosus*. Folia *fasciculata, simplicia*, Flores *laterales, subsessiles, speciosi, albi*.

Sp. 1. *C. Alexandri*.

There was also read an account of a new species of *Lepidosperma*. By Dr. John Lhotsky.

This species is nearly allied to the *Lepidosperma elatior* of Labillardière, and is remarkable for the great length of its leaves, varying from 10 to 15 and even 20 feet. A specimen exhibited to the meeting had the leaf upwards of 13 feet long. It was discovered by Dr. Lhotsky in Tasman's Peninsula, Van Diemen's Land, growing in a dense jungle, through which its long slender leaves contrive to penetrate. It is termed "Cutting Grass," and like the other spe-

cies of this Cyperaceous genus is characterized by the sharp edges of its leaves, which inflict wounds on the unwary traveller who happens to pass the plant hastily.

WERNERIAN NATURAL HISTORY SOCIETY.

The 32nd Session of this Society commenced last week, when the following gentlemen were elected office-bearers for 1839:

President.

Robert Jameson, Esq., F.R.SS.L. and E, Professor of Natural History in the University of Edinburgh.

Vice-Presidents.

Dr. Charles Anderson, M.R.C.S.
William Copland, Esq., F.R.S.E.
Dr. R. K. Greville, F.R.S.E.
John Sligo, Esq., F.R.S.E.

Secretary,—Dr. Pat. Neill, F.R.S.E.
Assistant-Secretary,—T. J. Torrie, Esq., F.R.S.E.
Treasurer,—A. G. Ellis, Esq.
Librarian,—James Wilson, Esq., F.R.S.E.
Painter,—P. Syme, Esq.
Assistant,—W. H. Townsend, Esq.

Council.

Dr. Walter Adam, F.R.C.P.
Dr. William Macdonald, F.R.S.E.
Dr. Martin Barry, F.R.S.E.
Rob. James Hay Cunningham, Esq.
W. A. Cadell, Esq., F.R.SS.L. & E.
Dr. Robert Hamilton, F.R.S.E.
Dr. Robert Graham, F.R.S.E.
Sir William Newbigging, F.R.S.E.

The seventh volume of the Society's Memoirs has just been published by Messrs. Black, containing the Essays by Mr. R. J. H. Cunningham and Dr. Parnell, for which honorary premiums were lately awarded; the former on the geology of the Lothians, illustrated by thirty-five coloured sections and a geological map, and the latter on the Ichthyology of the Forth District, illustrated by sixty-seven engraved figures.

ZOOLOGICAL SOCIETY.

April 10, 1838.—Rev. John Barlow in the Chair.

The first communication laid before the meeting was a description by Mr. Owen of the organs of deglutition in the Giraffe, being a supplementary note to his former memoir on the anatomy of that animal *.

Mr. Owen observes that since the Giraffes have been at the Gardens, they have not been known to utter vocal sounds, except once, at the time of coition, when the male uttered a cry like that of the Deer; and the incapacity of the species in this respect would seem to be indicated by the structure of the *glottis*, the *rima* of which

* [The abstract of the former memoir will be found at p. 227.—Edit.]

is permanently open for the space of a line, so that the chords cannot be brought into mutual apposition.

The modifications of the organs of deglutition accompanying this open condition of the fissure leading into the windpipe are very remarkable, and unlike any of the few deviations from the ordinary structures of the *fauces* and *glottis* hitherto noticed by anatomists in other animals (as in the Elephant, Camels, *Cetacea* and certain *Rodentia*, &c.).

On looking down the mouth into the *fauces* the cavity appears to be as completely closed as in the *Capibara*; but instead of narrowing in an infundibular form to a small circular depression, it is terminated by a transverse slit through which projects a soft, rounded, valvular ridge, formed by the broad superior margin of the *epiglottis*, which is folded down upon itself at that part. The surface of the *fauces* is broken by large risings and depressions, or is coarsely corrugated.

At the posterior part of the soft palate there is an oval glandular body about one inch in long diameter.

The tonsils are well-developed glands communicating with the *fauces* by a single wide opening, or *fossa*, and thus exhibiting a higher type of structure than they present in the human subject, where the mucous follicles terminate by several separate apertures. They are two inches in length and one in breadth.

Mr. Owen then proceeded to read the first part of a paper on the Anatomy of the *Apteryx*; the body of that bird having recently been presented to the Society's Museum by the Earl of Derby. The results of the anatomical examination, communicated to the Meeting on this occasion, embrace a detailed description of the parts connected with the digestive apparatus.

Commencing with the beak, Mr. Owen notices the general superficial resemblance which it bears to that of the Curlew and *Ibis*, though it differs essentially from this organ in the slender-billed waders, by having the perforations of the nostrils near the *apex*, and the base covered with a *cere*. The *cere* terminates anteriorly in a concave or lunated curve, resembling that of the *Rhea*. Two narrow grooves extend from the angles or cresses of the *cere* along each side of the mandible, the upper groove being continued to the truncated extremity of the mandible, the lower one leading into the external nostril, which forms, as it were, the dilated termination of the groove, and this occupies a position of which there is no other known example throughout the class of birds.

The *cere* was about an inch in length, furnished at its sides with

short stiff plumes and hairs, while at its base a number of long black bristles are given off, the presence of which, in conjunction with the extension of sensitive skin upon the beak, is considered by Mr. Owen to indicate the importance of the sense of touch to the *Apteryx*, and to correspond with the account given of its nocturnal habits. The general form of the beak is adapted for insertion into crevices and holes, in search of insects, which were found to constitute in part the contents of the gizzard.

The tongue, as in all the struthious birds, was short and simple, yet presented nevertheless a greater relative development. It was of a compressed, narrow, elongated, triangular form, with the *apex* truncate and slightly notched; the lateral and posterior margins entire; 8 lines in length, 4 lines broad at the base, 1 line across the *apex*.

The *œsophagus* at its upper extremity was half an inch in diameter, but rapidly diminished to a breadth of three lines, of which size it continued to the commencement of the *proventriculus*; its position was to the right of the cervical *vertebræ*, and a little behind and to the right of the *trachea*, to which latter it was closely connected.

The stomach was small, measuring less than two inches both in its longitudinal and transverse diameters: in shape it had more the character of a membranous stomach than of a gizzard, being of a regular oval-rounded form. The muscular fibres were not arranged in the definite masses called *digastrici* and *laterales*, but radiated from two tendinous centres of about two-thirds of an inch in the longest diameter. Upon the inner surface of the gizzard were two protuberances, one at the lower and one at the upper end of the posterior part. The situation of the latter was such with respect to the cardiac and pyloric openings, that Mr. Owen conceives it would tend to close these openings during the forcible contraction of the fibres at the upper part of the gizzard, and thus probably in some measure regulate the passage of food into this cavity, by retaining a portion in the *proventriculus*, until the gizzard should have become emptied of its previous contents.

A narrow pyloric passage of about three lines in length extended from the upper extremity of the gizzard into the *duodenum*; there was no sphincter present, and no pyloric pouch, as in the Ostrich, but the cuticle was continued into the *duodenum* about three lines beyond the *pylorus*.

The stomach was entirely concealed by a large omental adipose process, continued from that of the *peritoneum*, and upon the longitudinal division of which so much of the stomach was exposed as

projected between the lobes of the liver; its position was towards the left side of the *abdomen*.

The small intestines had a general diameter of three lines, their size slightly diminishing on approaching the *rectum*. The *cæca* at their commencement rather exceeded in diameter that of the *ilium*, their capacity slightly increasing to near their blind extremities, where, having attained the diameter of about five lines, they suddenly taper to an obtuse point. The anterior half of the *rectum* was contracted and the lining membrane thrown into longitudinal folds, but these gradually subsided in the second or dilated portion. The *rectum* communicated with the urinary dilatation by a small semilunar aperture, from which several short *rugæ* radiated. This compartment of the *cloaca* was not expanded into a large receptacle as in the Ostrich, but offered the same proportional size as in the Emeu, measuring about two-thirds of an inch in length and the same in diameter. The external compartment of the *cloaca* contained a large single *penis* retracted spirally, and one inch and a half in length when extended. It was traversed by an urethral groove, the sides of which were not beset with *papillæ* as in the Gander, but simply wrinkled transversely. At the back part of the *cloaca* there was a small *bursa* half an inch in length, and communicating by a wide longitudinal aperture with the external compartment.

The gizzard contained a greenish yellow pulpy substance, and numerous filamentary bodies, amongst which a few slender legs of insects and portions of the down of the *Apteryx* were the only recognizable organized parts; it also contained a few pebbles.

The liver consisted of two large lobes, connected by a narrow isthmus, the right being the larger and of a subtriangular figure; the left was more quadrangular in shape.

With respect to the physiological relations of the apparatus, Mr. Owen remarks that the whole is harmoniously co-adapted to the instruments of prehension which characterize the *Apteryx*.

A beak framed to seize and transmit to the gullet small objects, is succeeded by a simple and narrow muscular canal. The food being of an animal nature, and taken in small and successive quantities, is digested as fast as it is obtained, and therefore the *œsophagus* is not required to be modified to serve as a reservoir, either by its extreme width, or a partial dilatation. The *proventriculus*, in the comparative simplicity of its glands, and the gizzard, in its small size and medium strength, more forcibly bespeak structures adapted for the bruising and chymification of animal substances, presenting, as do worms and the softer orders of insects, a moderate resistance.

The length of the intestines, which somewhat exceeds that of the slender-billed insectivorous waders, and the size of the *cæca*, are considered by Mr. Owen to indicate an intention, that this bird, which is so remarkably restricted in its locomotive powers, should have every needful or practicable advantage in extracting from its low-organized animal diet, all the nutriment that it can yield.

April 24th.—R. C. Griffith, Esq., in the Chair.

Some notes by Mr. Martin were read, On the visceral anatomy of the Spotted Cavy, *Cœlogenus subniger*, taken from the examination of a male specimen which had died suddenly in the Menagerie of the Society. The length of the head and body along the spine measured about 1 foot 10 inches.

On opening the *abdomen*, the large folds of the *cæcum* presented themselves, occupying the whole of the umbilical and epigastric regions, while to the left appeared the coils of small intestine; and a portion of the stomach was seen to emerge from below the edge of the left portion of the liver. The *omentum* was of very small extent, destitute of fat, and crumpled up beneath the stomach.

The *duodenum* commenced in the form of a large pear-shaped sac, which measured in length $2\frac{3}{4}$ inches, when the intestine assumed its ordinary size, namely about half an inch in diameter. The dimension of the sac at its largest part was four inches in circumference. This pyriform commencement of the *duodenum* obtains in many Rodents, and also in some *Insectivora*; among the former may be noticed the *Coypus*, *Capromys*, and *Anæma*: in the insectivorous animal lately described (Zool. Proc. 1838, p. 17.) under the name of *Echinops Telfairi*, the same structure also is remarkable. The course of the *duodenum* was as follows: leaving the *pylorus* and loosely attached by mesentery, it described an arch over the right kidney, whence it passed over the spine to the left kidney; it then turned back to the spine, and there making several abrupt convolutions merged into the *jejunum*. In the sacculated part two *areolæ* of glandular follicles were apparent through the *parietes*. As in the Agouti, (Zool. Proc. 1834, p. 82.) the stomach had a constriction between its cardiac and pyloric portion; in which point (as does the Agouti,) it differs from the Acouchi, the dissection of which will be found in the Proc. of Com. of Sci. &c., 1831, p. 75. The length of the stomach undistended, or but slightly so, was 6 inches; the cardiac portions swelled out to the extent of nearly 2 inches beyond the entrance of the *œsophagus*, and its pyloric extremity swelled out into a process on each side, as in the Agouti. A muscular band, commencing at the entrance of the *œsophagus*,

passed longitudinally along the stomach, contracting the greater curve into *sacculi*, especially at the constricted portion. The length of the *œsophagus* within the abdomen was one inch and a quarter.

The length of the small intestines was very great, the measurement being 21 feet 8 inches.

The *cæcum* was large, *irregularly, multitudinously,* but *not deeply* sacculated; in form it was gently conical, terminating in a subacute *apex*; its length 2 feet 4 inches, its basal circumference about 7 inches. When blown up it formed a spiral turn and a half. The large intestines at their commencement were about 7 inches in circumference, the decrease being gradual. The lining membrane of the *colon* formed a series of regular longitudinal *striæ*, gradually disappearing as the intestine narrowed, until at length they finally disappeared. The *colon* in its course followed the circular sweep of the *cæcum* to which it was attached by a riband of mesentery $1\frac{1}{2}$ inch in breadth.

At about two feet from its origin the *colon* merges into a flat layer of circular folds, the intestine making four distinct gyrations; from this part to the *anus* the intestine measured 9 feet 3 inches.

The circular fold above noticed is analogous to the long loose fold observed in the same parts of the intestine in other *Rodentia,* as the *Coypus,* and *Capromys,* and which is noticed in the respective accounts of the dissection of those animals in the Zoological Proceedings.

The lungs consisted of three right and two left lobes. The heart was round, and firm in texture, the left ventricle being very stout; the *apex* exhibited a slight tendency to a bifid figure. The *aorta* at its arch sent off *first* an *arteria innominata,* which divided into a right subclavian, and a right and a left carotid; then *secondly,* at a quarter of an inch further, *a left subclavian,* in an undivided condition.

The generative organs agreed closely with those of the Acouchi.

The tongue was $3\frac{1}{2}$ inches long, fleshy, rounded at the tip; the upper surface villose, with fine close hairy *papillæ*; at its base were numerous, large, mucous follicles.

MISCELLANEOUS.

LARUS JACKSONII, JACKSON'S GULL.

Mr. Couch, in his lately published 'Fauna of Cornwall,' has introduced a species of *Larus* under the above name as new to science.

He considers it as hitherto confounded with the herring gull, and in the plumage it agrees in every respect, except that it seems to be more glossy. They differ however materially in size, the new bird being about a pound heavier, about four inches longer, and in the expanse of the wings exceeding the herring gull by nine inches. In *L. Jacksonii* the bill is far stouter in proportion and much paler; the legs of a livid flesh colour, and the membrane of the finest silky texture to feeling and sight. They seem equally common with the herring gull. In a genus so nearly allied as the gulls, this bird may have been overlooked, and we would suggest that Mr. Couch should send specimens to Mr. Selby and Mr. Yarrell for examination and comparison.—Couch, *Fauna of Cornwall,* p. 28.

CYCLOPTERUS CORONATUS, CORONATED LUMP FISH, COUCH.

Of this species, new to the British Fauna if not to science, I have examined only one specimen; the small size of which causes me to suppose that it has hitherto been overlooked from its likeness to the young of the common lump fish. The specimen was about eight lines in length, of the same general proportions. About the centre of gravity, near the summit of the back, is a wide and moderately long fin, the extremity declining; the second dorsal separated from the first by an interval, and placed opposite the anal. Colour, a dark green on the back, lighter on the sides, whitish below, a silvery line across the head, uniting the posterior portion of the eyes, and from this on each side a line running forward, approximating and then receding at right angles, thus resembling the Greek Ω, but with a square instead of a circular summit. The specific name is from this mark. The differences between this and the common lump fish are, the entire want of tubercules, which in the latter give a grotesque appearance to the back, the want of the flat space between the termination of the ridge and the (only) dorsal fin; and more especially in the moderately elongated first dorsal fin, which bears no resemblance to the vestige of fin described as possessed by the painted lump fish.—Couch, *Fauna of Cornwall,* p. 48.

FRENCH EXPEDITION OF DISCOVERY TO THE SOUTH POLAR SEAS.

This expedition, undertaken by the French Government, under the command of M. D'Urville, has completely failed. The vessels, Astrolabe and Zelée, were not able to penetrate beyond the 64° south, being fully 10° short of the parallel reached by Weddel. They were stopped by a compact barrier of ice, and found the whole sea in the latitude we have mentioned completely frozen.

VIOLA LACTEA.

A very excellent botanist and one of our most "zealous" pupils, John Nicholson, Esq., of Lincoln, has found a very remarkable state of *Viola lactea*, Linn., 'E. Bot.' t. 445, in the neighbourhood of that city (at Boultham Lane, on both sides of the road), in habit so unlike the figure just quoted that it might at first sight be taken for a distinct species. Except at the base the stems are quite erect, and many of the specimens from a foot to eighteen inches tall, with the leaves and peduncles very remote from each other, and many of the flowers apetalous. Reichenbach's *V. lactea*, 'Iconogr. Bot.' t. 99, however, admirably represents this variety, only that the latter is much smaller, not above a span high. Its flowers are very pale blue, almost milk-coloured, otherwise it is hardly to be distinguished from some states of *Viola montana*, L.—SIR W. J. HOOKER.

METEOROLOGICAL OBSERVATIONS FOR NOVEMBER 1838.

Chiswick.—Nov. 1. Overcast: rain: clear at night. 2, 3. Fine. 4. Rain. 5. Fine. 6. Very fine. 7. Rain: fine: windy at night. 8. Clear and fine: rain. 9. Heavy rain. 10. Clear and fine. 11. Dense fog. 12. Clear and cold. 13. Frosty: fine. 14. Frosty and foggy. 15, 16. Foggy. 17. Foggy: fine. 18, 19. Rain. 20. Cold haze. 21—23. Foggy. 24. Bleak and cold. 25, 26. Frosty. 27. Overcast. 28. Heavy rain: hurricane at night. 29. Boisterous with heavy rain: much thunder and lightning at night. 30. Rain. fine.

Boston.—Nov. 1. Fine: rain early A.M. 2, 3. Fine: rain P.M. 4. Cloudy: rain P.M. 5. Cloudy. 6. Fine. 7. Cloudy: rain early A.M. 8. Fine. 9, 10. Cloudy. 11. Foggy. 12, 13. Fine. 14. Foggy. 15. Cloudy. 16, 17. Foggy. 18. Cloudy: rain A.M. and P.M. 19. Stormy. 20, 21. Cloudy. 22. Cloudy: rain early A.M. 23, 24. Cloudy. 25, 26. Fine. 27. Stormy. 28. Cloudy: stormy with rain P.M. 29. Stormy: rain early A.M. 30. Stormy.

Applegarth Manse, Dumfries-shire.—Nov. 1. Heavy showers: hail. 2. Fair but cloudy. 3. Frequent showers. 4. Fair and cloudy. 5. Moist: slight showers. 6. Fair: one slight shower. 7. Rain all day: high flood. 8. Occasional showers. 9. Fine day. 10. Fine day: rain P.M. 11. Fine day after snow. 12. Hard frost: clear and serene. 13. Temperate. 14. Cloudy and raw. 15. Thick fog. 16. Cleared up: dry. 17. Rain in the night: cold. 18. Cold drying day: snow on hills. 19. Cold and threatening a fall. 20. Still cold, yet dry. 21. Still threatening a fall. 22—26. Cold and dry. 27. Cold: snow three inches deep. 28. Wet in the night: ditto P.M. 29. Very wet day and stormy. 30. Showery and stormy: flood.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. Roberton; *by* Mr. Thompson *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. Veall *at Boston, and by* Mr. Dunbar *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1838. Nov.	Barometer.						Thermometer.								Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	9 p.m.	Fahr. 9 a.m.	Self-register. Max.	Self-register. Min.	Max.	Min.		9a.m.	9p.m									
1.	29·420	29·428	29·371	28·96	29·30	29·24	48·7	49·2	39·6	52	36	45·0	40	36	W.	SW.	calm	SE.	·383	·12	·15	...	42
○ 2.	29·358	29·424	29·316	28·92	29·12	29·41	41·7	51·0	38·7	49	30	42	38	34	S.	SW.	calm	SW.	·077	·04	...	...	40
3.	29·464	29·460	29·064	29·11	29·39	29·02	39·8	48·2	36·4	52	40	37	31	40	SSW.	S.	calm	S.	·038	...	·11	...	38
4.	28·848	29·034	28·844	28·45	28·89	29·05	45·6	47·9	40·6	56	39	45	42	44	S.	SW.	calm	W.	·133	·06	·15	...	41
5.	29·156	29·603	29·204	28·75	29·33	29·56	46·4	51·2	40·7	52	29	46	42½	36	SW.	W.	calm	W.	·050	...	·03	1·95	42
6.	29·722	29·738	29·687	29·28	29·70	29·61	40·4	50·3	38·9	56	42	39	30	36½	W.	SW.	calm	SW.	...	·26	...	...	38
7.	29·462	29·493	29·448	29·53	29·27	29·00	53·7	54·4	40·9	61	47	53	44½	46½	SE. var.	SW.	calm	SW.	·166	·02	·18	...	45
8.	29·554	29·656	29·457	29·	29·12	29·26	50·4	57·7	49·3	57	44	48·5	46	44½	SW. var.	SW.	NW.	SW.	·011	·30	...	...	46
☾ 9.	29·370	29·590	29·374	28·97	29·27	29·40	46·3	54·7	46·3	52	32	44	42½	40	WNW.	SW.	calm	SW.	·250	·10	...	...	45
10.	29·708	29·826	29·720	29·25	29·70	29·70	43·8	50·3	39·5	50	28	43	38	31½	SW.	SW.	calm	W.	·061	...	...	...	42
11.	29·654	29·830	29·635	29·27	29·59	29·98	33·4	48·0	33·6	43	34	32	36	31½	W.	NE.	calm	E.	...	...	...	...	36
12.	30·096	30·389	30·126	29·80	30·28	30·34	37·9	41·6	37·3	47	27	36·5	30	36	N.	NE.	calm	E.	...	...	...	0·20	35
13.	30·424	30·462	30·125	30·03	30·40	30·36	37·9	46·6	35·7	48	25	31	38½	36	N.	NE.	calm	SW.	...	...	...	...	36
14.	30·250	30·264	30·064	29·98	30·28	30·12	37·8	47·7	35·3	48	38	26	34½	38	N.	E.	calm	SW.	...	...	...	...	34
15.	29·924	29·989	29·804	29·55	29·94	29·72	42·0	46·7	38·2	45	41	40	32½	34	E.	E.	calm	SE.	...	...	...	...	38
16.	29·698	29·737	29·686	29·30	29·52	29·59	43·7	45·2	41·8	46	35	41	36½	40½	E.	N.	calm	SE.	...	...	...	...	41
● 17.	29·746	29·772	29·697	29·34	29·68	29·77	41·8	46·7	41·0	51	40	42	38	34	S.	N.	calm	NE.	...	·32	...	...	38
18.	29·632	29·680	29·640	29·33	29·86	29·86	43·7	46·7	42·0	46	39	43	30	32	N.	NE.	calm	NE.	·261	·40	...	...	40
19.	29·566	29·589	29·540	29·37	29·77	29·72	40·0	45·0	40·8	41	37	42	36½	32	NE.	NE.	NE.	E.	·327	·10	·15	0·20	39
20.	29·656	29·677	29·569	29·39	29·74	29·66	38·8	39·8	37·8	40	35	40·5	36	46	NNE.	NE.	calm	E.	·116	...	...	...	36
21.	29·410	29·455	29·263	29·19	29·55	29·50	38·7	40·7	36·4	50	49	39	36	36½	NE.	E.	E.	E.	...	·13	...	...	36
22.	29·156	29·406	29·184	28·95	29·48	29·40	44·4	45·3	38·4	50	37	42	38	38	NE.	E.	E.	E.	·122	·02	·06	...	40
23.	29·514	29·602	29·510	29·23	29·60	29·66	43·7	47·5	42·7	51	36	41	40	36½	NE.	E.	calm	E.	·033	...	...	...	40
☽ 24.	29·568	29·858	29·581	29·33	29·77	29·94	38·8	44·3	37·6	40	23	38	39½	32½	NNE.	NE.	NE.	E.	...	...	...	...	35
25.	29·994	30·036	29·988	29·68	30·04	29·96	33·3	39·6	32·4	39	26	34	32	36	N.	E.	calm	NE.	...	...	...	...	34
26.	29·880	29·916	29·851	29·59	29·86	29·76	32·7	37·8	32·5	39	27	34	34	30	E.	E.	NE.	E.	...	...	...	2·22	28
27.	29·490	29·469	29·207	29·27	29·44	29·24	33·8	34·3	30·0	47	34	31	31	33	ENE.	E.	NE.	E.	...	·04	...	...	30
28.	29·040	29·031	28·717	28·75	28·98	28·31	41·8	42·5	33·8	53	46	41	36	46	E.	E.	calm	E.	·041	1·21	·04	...	35
29.	29·658	28·879	28·673	28·22	28·12	28·18	48·7	51·7	41·8	53	44	50	44	44½	S.	SSW.	SW.	SW.	·216	·43	·30	...	42
30.	28·958	29·320	29·030	28·43	28·50	28·94	47·6	52·0	46·4	53	43	48·5	45	46	SE.	S.	W.	WSW.	·450	...	...	...	42
Mean.	29·580	29·653	29·479	29·20	29·31	29·50	41·9	46·8	38·9	48·9	36·03	40·5	36·9	37·6					Sum. 2·735	3·55	1·17	4·57	Mean. 38·5

ANNALS OF NATURAL HISTORY.

XLIV.—*On two Species of a new South African Genus of the Natural Order* RHIZANTHEÆ *of Blume.* By the Honourable W. H. HARVEY. *Communicated by* Sir W. J. Hooker, Reg. Prof. Bot. Glasgow, F.R.S., L.S. With Plates XIX. and XX.*

HAVING lately received from my valued friend Mr. Harvey the drawings here represented, and the following descriptions of two extremely interesting plants of Blume's *Rhizantheæ*, I cannot do better than lay them before the public in the state in which I have received them, without venturing to offer any remarks of my own respecting vegetable productions, whose structure, to be rightly understood, must be examined in a recent state, and such an opportunity is of rare occurrence with any naturalist. Mr. Harvey indeed has not had it in his power to compare his plants with the figures and descriptions of allied genera of Richard or of Endlicher in his valuable 'Meletemata Botanica,' and hence he was led to think it possible that they might be referred to *Scybalium* of the latter author; but the characters are extremely different in the two, and I have little hesitation in adopting the name suggested by Mr. Harvey, from the spoon-shaped form of the segments of the perianth, *Mystropetalon.* It seems to belong to the group of *Balanophoreæ.* Probably the *Phelypæa sanguinea* of Thunberg, which Jussieu refers to *Cytinus*, and of which Persoon makes the genus *Hypolepis*, may be one of these; but that plant is so ill defined by its discoverer, (who appears to be the only person to whom it is known,) that we cannot possibly come to any satisfactory conclusion; yet "si auctori aliqua fides habenda," as Endlicher remarks, it must be something very different; his being a "diœcious plant, with a 6-lobed perianth, a short style and capitate stigma."

* [These Plates will be found in the SUPPLEMENT published with the present Number.—EDIT.]

Mystropetalon, Harv. MS.

Gen. Char.—*Flowers* monœcious, in dense spikes, the males forming the upper, the females the lower half of the spike. *Bracteæ* 3 under each flower, one (*anterior*) generally free, 2 (*lateral*) more or less combined.

Male: *Perianth* tripartite, the segments spathulate, unguiculate, the two posterior combined. *Stamens* two, opposite to, and inserted on the posterior segments of the perianth, conniving, but not combined; *anthers* versatile, 2-celled, opening longitudinally; *pollen* cubical, with fluted angles!—A very minute abortive ovary.

Female: *Perianth* sub-globose or tubular, tridentate, superior, deciduous. *Torus*? fleshy, cup-like, expanded round the base of the ovary, but attached to it only by a central point, finally deciduous with the ovary, to which it remains attached! *Ovary* ellipsoidal, attenuated at the base, containing a fleshy mass (without distinction of ovules?!). *Fruit* indehiscent, ellipsoidal, with a very thin juicy pericarp, and crustaceous endocarp, containing an indefinite number of minute sporules, into which the whole of the fleshy mass of the ovary appears to be dissolved.

Specific characters.

1. *Mystropetalon Thomii*, Harv. MS.—*Anterior* bracteæ broadly oblong, (in anthesis,) one-third longer than the lateral. *Limbs* of the segments of the male perianth lanceolate; female perianth sub-globose, obtusely tridentate (Pl. XIX.).

Hab. "About Caledon Baths." *Rev. Dr. Thom*, who pointed it out to Mr. Bowie in 1818. Same locality, *Ecklon*, 1831. *Mr. Polemann*, 1837.

Stem thick and fleshy, closely covered with linear, obtuse, smooth scales, the uppermost often bearded at or about the apex, the lowermost sometimes elongated, and sometimes all are so. *Spike* very dense, 3—4 inches long, obtuse.

Males: *Anterior* bractea oblong, of nearly equal breadth throughout, obtuse, bearded at the apex and along the prominent keel, ciliated at the margins; the beard and cilia long, orange. *Lateral* bracteæ combined at base, sometimes nearly free, oblong, obtuse, membranous, sometimes ciliate along the

keel, more than half as long (generally $\frac{2}{3}$rds) as the anterior, dark purplish-red at the apex, pale below; the anterior red with yellow margins. *Perianth*, segments united at base into a cup, the anterior nearly as long as the posterior, limb lanceolate obtuse, somewhat concave, dark brown-red; claws yellow, flat or slightly channeled. *Filaments* subulate, robust; anthers distinct; pollen cubical, with fluted angles.

Females: *Anterior* bractea as in the male; *lateral* (in *anthesis*) rather longer than it, boat-shaped, acute, with a sharp ciliate keel, distinct; in *fruit* very much enlarged, and much longer than the anterior, yellow with red tips. *Limb* of the perianth subglobose or ellipsoidal, obtusely trifid or tricrenate, red. *Style* much exserted, filiform. *Ovary* oval-oblong, seated in a white, fleshy, cup-like torus, to whose centre it is attached by the attenuated base, dark red, minutely hispidulous, containing a fleshy mass, in the centre of which is a white body, of whose nature I cannot satisfy myself. In some ovaries it is very obscure. Ripe fruit deciduous, with the *torus* (which surrounds its base very much like the *arillus* of a seed) resembling the ovary, and but little enlarged, dark vinous red, slightly fleshy, with a thin but hard crustaceous endocarp. *Contents*, myriads of minute, white, cellular bodies, into which the fleshy mass of the ovary is dissolved.

M. Thomii. A. flowering plant. B. plant in fruit, *nat. size.* Fig. 1. female flower (anthesis); 1*. ditto, in fruit; 2. ditto, back view; 3. ditto, with the bracteæ removed; 4. female perianth, which varies in form; 5. male bracteæ; 6. ditto, separated; 7. ditto, back view; 8. male flower; 9. male perianth; 10. ditto, dissected.

2. *Mystropetalon Polemanni*, Harv. MS. *Anterior* bractea spathulate, with a narrow claw; *limbs* of the segments of the male perianth elliptical, very concave; female perianth tubular, trifid (Pl. XX.).

Hab. At Hoouw Hoch Pass, *Mrs. Denys*, who communicated the only specimen yet seen to Mr. Polemann, from whom I received it.

M. Polemanni, fig. 1. female flower (anthesis), front view; 2. ditto, back view; 3. ditto, the anterior bractea removed, and the lateral pulled open; 4. 5. different views of the perianth; 6. base of the ovary, showing its insertion into the torus? 7. ovary and torus? cut through; 8. front view of the male bracteæ; 9. back view of ditto;

10. and 11. male flower, different views, one more advanced than the other; 12. segments of the male flower separated; 13. anther; 14. pollen.

[*M. Polemanni* agrees with *M. Thomii* in most particulars, except such as are noted in the figures. The *colour* of its flowers is however very much brighter; that of the beards of its bracteæ a bright orange, the perianth carmine.—W. H. H.]

XLV.—*On the Synonymy of* Passandra, *with Descriptions of all the old and of a few new Species.* By Edward Newman, F.L.S.

Class COLEOPTERA. Natural Order CUCUJITES.

Œconomy.—On this subject little appears to be known: from their depressed shape and their close resemblance to the true *Cucuji*, the *Passandræ* are supposed to be wood-feeding insects.

Geographical Distribution.—Gambia, Cape of Good Hope, Sumatra, Java, Carolina, Cuba, Brazil.

Authorities and Genera.—The genus *Passandra* was established by Dalman in the appendix to Schönherr's 'Synonymia Insectorum,' in the year 1817. The only species referred to the genus was *P. sexstriata*, an insect nearly as large as *Passalus cornutus*, and inhabiting Sierra Leone and some other parts of Africa. A second species was described by Mr. G. R. Gray in the English translation of Cuvier's 'Règne Animal.' A third species I described in the 'Entomological Magazine.'

Closely allied to *Passandra* of Dalman is a genus of my own characterized in the 'Entomological Magazine' under the name *Hectarthrum*, of which one species, *H. curtipes*, from Western Africa, is described.

Very nearly related to *Passandra* and *Hectarthrum* is a third genus, characterized by Mr. Westwood in the 'Zoological Journal' under the name of *Catogenus*, and by Perty in his account of the Annulosa of Brazil, collected by Spix and Martius, under the name of *Isonotus*. Mr. Westwood refers to the *Cucujus rufus* as his type, and M. Perty describes a

new species. To this genus belongs the *Anisocerus* of Hope*. The name *Catogenus* has the claim to priority.

Fabricius in the genus *Cucujus* describes four insects referrible to one or other of the above genera; but unfortunately, little anticipating the capture of several kindred species, he has not described them with sufficient accuracy to establish their identity without a comparison of specimens.

Did not these subdivisions exist I should scarcely be inclined to propose them; however, I think it better not to undo hastily what has been done with care. I shall not hesitate to employ them.

Genus Passandra, *Dalman.*

Linear, depressed, and in habit somewhat resembling *Passalus*; head porrected, of nearly the same breadth as the prothorax, and having a deep transverse posterior furrow; eyes small, lateral, roundish, and but little prominent. The antennæ are 11-jointed, rather more than half the length of the body, and inserted near the base of the mandibles; the 1st oint is stout and obovate, the second short and almost spherical, the remainder are nearly equal, obconic, rather compressed, and each produced at its apex interiorly; the last joint is larger than the rest, more compressed and obliquely truncate. The head is impressed posteriorly by a very deep transverse furrow. The tarsi are 5-jointed, but the basal joint is very short and nearly obsolete†.

Sp. 1. *Pass. sexstriata.* (Corp. long. 1·4 unc. lat. ·4 unc.)
,, ,, Dalman, Schönherr's Syn. Ins. Appendix, p. 146.

Head, prothorax, femora, and entire underside obscure red, the other parts black and shining. The head has a deep transverse furrow parallel to the anterior margin of the prothorax; at each posterior angle of the head this is joined by a longitu-

* But not *Isocerus* of Illiger as quoted by Mr. Westwood in the 'Zoological Journal,' and by the Count Dejean in his 'Catalogue des Coleoptères,' *Isocerus* being merely a synonym of *Parandra.*

† The instrumenta cibaria of each genus have been carefully and elaborately described by the author who has proposed it. I do not repeat them, finding the three descriptions nearly identical, having nothing additional to offer, and considering moreover that they are by no means essential to the object of this paper.

dinal marginal furrow which originates near the base of the antenna and passes above the eye; anteriorly the head has three deep impressions, of which the middle one occupies the clypeus, and the lateral ones are nearly approximate to it, but rather further back towards the crown of the head. The prothorax has a posterior and marginal lateral ridge which is produced on each side the head; dorsally, rather behind the middle, it had two obscure impressions. Each elytron has three longitudinal furrows; the 1st is deep, near the suture, originating by the side of the scutellum and extending to the apex; the second also deep, originating dorsally near the shoulder, but ceasing considerably before the apex; the third is vague and shallow, originating laterally considerably below the shoulder, passing round the termination of the second and ceasing near the apex.

Inhabits Sierra Leone. A single specimen obligingly lent me for description is in the cabinet of the Rev. F. W. Hope. A very lengthened, minute and accurate description of this insect by Dalman will be found in the Appendix to Schönherr's Synonymia Insectorum, p. 146.

Sp. 2. *Pass. Columbus.* (Corp. long. 1·2 unc.; lat ·325 unc.)
,, ,, Newman, 'Entomological Magazine,' vol. v. p. 398.

Pitchy black, shining, with an obscure longitudinal stripe of red on each elytron. The head has a deep transverse furrow nearly parallel to the anterior margin of the prothorax; at each posterior angle of the head this is joined by a longitudinal marginal furrow, which originates near the mandibles, curves outwards to the base of the antenna, and passes above the eye; anteriorly the head has one deep impression occupying the clypeus, and on each side of this a vague and diffuse linear impression extends from each mandible to the great transverse furrow. The prothorax has a posterior and lateral marginal ridge which is acutely produced on each side of the head; dorsally it has two abbreviated furrows, originating almost close to the anterior margin and ceasing at about two thirds of the entire length of the prothorax; these furrows are very distant and considerably nearer the lateral margins than the

centre of the prothorax. Each elytron has two deep longitudinal furrows, the first originating by the side of the scutellum and extending to the apex; the second originating dorsally near the shoulder and terminating considerably before the apex; exterior to this furrow are several ill-defined and inconstant linear impressions.

Inhabits Brazil. A single specimen (from which the description is taken) is in the cabinet of the Entomological Club; a second is in that of the Rev. F. W. Hope, and three others in that of Mr. Children.

Sp. 3. *Pass. fasciata.* (Corp. long. ·65 unc. lat. ·2 unc.)
,, ,, G. R. Gray, Translation of the Règne Animal of Cuvier by Griffith and others, Insecta, vol. ii. p. 93.
Parandra ,, G. R. Gray, *loc. cit.* tab. lx. fig. 2. and tab. lxxv. fig. 1. anatomical detail.

Deep red, extremely glabrous; antennæ pitchy black; elytra red, with a sutural and marginal black longitudinal stripe on each; tibiæ black. In sculptural markings those given with the preceding species will nearly describe the present; the impression on the clypeus is less deep; the prothorax is more attenuated posteriorly, and the posterior angles are more prominently and acutely produced; exterior to the second furrow of each elytron is a very distinct longitudinal linear impression abbreviated at each end.

Inhabits the Island of Cuba. A single specimen is in the cabinet of the Rev. F. W. Hope, and two in that of Mr. Children.

Genus Hectarthrum, *Newman.*

In habit resembling *Passandra,* but having the antennæ considerably shorter, moniliform, and more or less incrassated in the middle; the joints separately are shorter and more robust, often nearly circular, and the terminal joint is rarely larger, and in some species smaller than the rest; it is compressed and truncate. In one sex the antennæ are obviously incrassated in the middle, the sixth joint being the largest. The head has a deep transverse furrow, and two equally deep frontal longitudinal furrows, which unite with the transverse one. The tarsi are 5-jointed, the basal joint being shorter than the rest.

Sp. 1. *Hect. curtipes.* (Corp. long. ·65 unc.; lat. ·325 unc.)
,, ,, Newman, 'Entomological Magazine,' vol. v. p. 398.

Black shining, the abdomen, coxæ, femora, and a large oval spot near the apex of each elytron red. The head has a deep but diffuse transverse furrow posteriorly; at each posterior angle of the head this is joined by a shallow but clearly defined sinuous longitudinal marginal furrow, which originates at the base of the mandible and passes by the antennæ and above the eye; the clypeus has on each side an elongate tubercular elevation; again on each side beyond this is a vague longitudinal impression, which posteriorly assumes the character of a deep furrow, and these two unite with the great transverse furrow. The prothorax has an extremely slender posterior and lateral marginal ridge, also two impressed longitudinal dorsal furrows; these originate in the anterior margin, and proceed in a direct line one to each posterior angle. Each elytron has two deep longitudinal furrows; the first originates by the side of the scutellum and extends to the apex; the second originates dorsally, near the shoulder, and ceases considerably before the apex.

Inhabits Senegal. The specimen from which the description is taken I believe to be unique, in the cabinet of the Entomological Club.

Sp. 2. *Hect. gigas.*
Cucujus gigas, Fabricius, 'Syst. Eleu.,' vol. ii. p. 92.

"Body very large for the genus *Cucujus,* depressed, smooth, black and shining. The margin of the prothorax unarmed. Elytra glabrous, black, with two distant impressed furrows; and between these, towards the apex, a large red spot."—*Fab.*

"Inhabits Guinea. In the Museum of M. Sehestedt."—*Fab.* It is very evident that this resembles the previously described species, but the anomalous antennæ and the furrows of the prothorax could scarcely have escaped the careful eye of Fabricius.

Sp. 3. Hect. brevifossum. *Atra, glaberrima, abdomine pedibusque piceis: prothoracis striæ duæ laterales, singuli elytri tres, fossulaque brevissima antica inter primam et secundam.* (Corp. long. ·7 unc.; lat. ·2 unc.)

Brilliantly shining black, the abdomen and legs inclining

to pitchy red. The head has an extremely deep transverse furrow, parallel to the anterior margin of the prothorax; at each extremity this is joined by a slight longitudinal marginal furrow, which passes above the antenna and eye; the clypeus has an oval impression, and behind it on each side is a very deep longitudinal furrow; these last unite with the great transverse furrow. The prothorax has a posterior and lateral slender marginal ridge; anteriorly this is angular, but not produced by the side of the head; posteriorly it is incrassated in the middle, and as it were turned back over the disk of the prothorax; on each side it has dorsally an obvious but not deep furrow, originating near the anterior margin, and terminating in the posterior angle. Each elytron has four furrows: the first originates by the side of the scutellum and terminates in the apical angle; the second is very short, scarcely a sixth of the entire length of the elytron, and situated near the anterior extremity of the third, which originates dorsally near the shoulder, and ceases considerably before reaching the apical angle; the fourth is equidistant from the third and the marginal ridge of the elytron; it is less deep than the others; it originates laterally, considerably below the shoulder, and surpasses the third, but still does not reach the apical angle.

Inhabits the island of Java. One example, from which the above description is taken, is in the cabinet of the Rev. F. W. Hope. A second is in the British Museum, but its habitat is unknown. A third, of much larger size than either of the foregoing, is in the cabinet of Mr. Children, and this last has the antennæ very much incrassated in the middle.

Sp. 4. Hect. trigeminum. *Atra nitida, femoribus piceis: prothoracis striæ duæ laterales, singuli elytri tres, quarum interna longior, intermedia brevior, externa mediocris.* (Long. corp. ·75 unc.; lat. ·2 unc.)

The colour is black and very shining; there is no trace of any other hue except in the femora, which incline to pitchy black. The head has a deep transverse furrow near its posterior margin; at each posterior angle of the head this is joined by a longitudinal marginal furrow, which originates near the base of the antenna, and passes above the eye; the clypeus has a diffuse oval impression, and on each side of this

commences a deep longitudinal furrow; these two unite with the great transverse furrow. The prothorax has a posterior and lateral marginal ridge; this, in the centre of the posterior margin, is incrassated, and as it were folded back on the disk: from each posterior angle of the prothorax arises a small keel-like ridge; this meets a longitudinal discoidal furrow, which, after nearly touching the anterior margin, turns inwards along the margin, and nearly unites with the corresponding furrow of the opposite side. Each elytron has three furrows; the first originates by the side of the scutellum and extends to the apical angle; the second dorsal, but distant from the first; it originates considerably below the basal margin and ceases as much before the apex; the third is near the second and extends beyond it at both ends.

There are two examples of this insect in the British Museum; from the largest of these, whose dimensions are given above, the description is taken; the second specimen agrees in every particular except that it is scarcely half the size. There is no record preserved of the habitat or donor.

Sp. 5. *Hect. heros.*
Cucujus heros, Fabricius. 'Syst. Eleu.,' vol. ii. p. 92.

"In habit and size this species resembles *Cucujus gigas.* The antennæ are short, stout, moniliform, and in one sex with the joints prominent beneath, serrated. The head has stout porrected mandibles and a bisulcated forehead; the prothorax is flat, black, and has a furrow on each side. The elytra are black, immaculate, and unequally striated. The body is black, the femora red."—*Fab. loc. cit.*

"Inhabits the island of Sumatra: in the museum of Mr. Lund."—*Fab.* This cannot, as I imagine, be identical with the preceding; the three obvious furrows on each elytron in *H. trigeminum* could scarcely be described as "elytra inæqualiter striata." The femora moreover are not red.

Sp. 6. *Hect. bistriatum.* (Corp. long. ·54 unc. lat. ·14 unc.)
Passandra ,, Castelnau, 'Hist. Nat. des Animaux articulés,' Ins. vol. ii. p. 384.

Black and very shining, the abdomen and legs inclining to pitchy red. The form of this insect is linear and more cylindrical, the antennæ are moniliform and stout. The sculp-

ture of the head is precisely as in *H. trigeminum* above described, except that the impression on the clypeus is interrupted posteriorly by the anterior extremity of a raised glabrous elevation, which occurs between the two deep longitudinal furrows. The prothorax is precisely as in that species. Each elytron has two furrows; the first originates by the side of the scutellum and terminates in the apical angle; the second originates dorsally near the shoulder and ceases considerably before the apical angle; at the base of the elytra, equidistant from these striæ, is a deep puncture.

Inhabits the island of Java. I am indebted to the Rev. F. W. Hope and Mr. Shuckard, who possess the only examples I have seen, for the opportunity of describing this species.

Sp. 7. Hect. gemelliparum. *Nigra, nitida, abdomine pedibusque piceis: prothoracis striæ quatuor, duæ distantes laterales indistinctæ postice abbreviatæ, duæ approximatæ discoidales profundæ brevissimæ, posticæ; singuli elytri striæ quatuor pariter dispositæ.* (Corp. long. ·6 unc. lat. ·16 unc.)

Black and shining, the abdomen and legs inclining to pitchy red. The form linear and subcylindrical, the antennæ moniliform, the sculpture of the head as in *H. trigeminum.* The prothorax has a posterior and lateral marginal ridge, the posterior part incrassated, reflexed, and notched in the middle; on each side it has dorsally an obvious but not deep furrow, which reaches neither the anterior nor posterior margin: near the posterior margin, but not adjoining it, rise two deep abbreviated furrows; at the base they are nearly approximate, but diverge anteriorly and cease abruptly at the centre of the disk of the prothorax. Each elytron has four striæ in pairs; the first of these extends from the side of the scutellum to the apical angle; the second, approximate to the first, is considerably abbreviated at both extremities; the third distant from the second and equally abbreviated at both extremities; the fourth approximates to the third, which it surpasses at both extremities, but reaches neither the base nor apex of the elytron.

Inhabits Senegal. A single specimen above described is in the cabinet of the Rev. F. W. Hope; a second in that of Mr. Westwood, both obligingly lent me for description.

Sp. 8. Hect. semifuscum. *Caput et prothorax fusca, cætera obscure ferruginea; lineæ prothoracis duæ laterales, antice obsoletæ, discus complanatus, punctatus; singuli elytri striæ quatuor pariter dispositæ.* (Corp. long. ·4 unc. lat. ·08 unc.)

Head and prothorax dark brown, elytra, abdomen and legs ferruginous. The head is rugose; there is a very obvious impression on or rather behind the clypeus; the transverse and longitudinal furrows of the head are deep and very distinct; the antennæ are somewhat more slender, and the joints more elongate than in the others of this genus; the terminal joint is also much larger. The prothorax has a posterior and lateral marginal ridge, the posterior portion being incrassated, reflexed, and notched in the middle; on each side a line arises from the posterior angle, and proceeding upwards towards the anterior margin ceases at about half the length of the prothorax. Each elytron has four striæ in pairs; the first originates by the side of the scutellum and extends to the apical angle; the second, approximate to the first, is considerably abbreviated at each end; the third, distant from the second, is also abbreviated at each end, but extends rather below the second; the fourth approximates to the third, originates nearer the shoulder, and extends rather below it.

Habitat unknown. There is one specimen in the cabinet of the British Museum without record of its locality.

Sp. 9. *Hect. rufipenne.*

Cucujus rufipennis, Fab., 'Syst. Eleu.' ii. 93.

"Black, with the elytra alone ferruginous."—*Fab. loc. cit.*

"Inhabits the island of Sumatra. In the museum of M. Sehestedt."

The brief description of this species agrees tolerably well with *H. semifuscum*, but as it enters into no particulars whatever as to the sculpture, it would be inexcusable to conclude from so trivial a similarity as that of colour that the species were identical.

Genus Catogenus, *Westwood. Isonotus*, Perty. *Anisocerus*, Hope.

Antennæ moniliform and of equal thickness throughout. Head with two deep frontal longitudinal furrows which do not reach the transverse posterior furrow. The tarsi are very distinctly 5-jointed.

Sp. 1. Cato. carinatus. *Obscure ferruginea: prothorax crebre punctatus: singuli elytri striæ duæ, interstitiis punctis et quadrilineatis.* (Corp. long. ·45 unc. lat. ·075 unc.)

Entirely of a dusky ferruginous or pitchy red, not very shining. The form is depressed, linear, and very narrow. The antennæ are of nearly uniform substance, each joint externally incrassated; the terminal joint is slightly longer but not thicker than the rest. The head has a deep transverse furrow near its posterior margin; at each extremity this is joined by a lateral marginal furrow, which originates near the insertion of the mandible, and passes above the antenna and eye: in front of the transverse furrow, but quite unconnected with it, are two deep elongate impressions, and between these is a very slightly marked line, which proceeds from the middle of the transverse furrow to the clypeus, where it terminates in a circular impression. The prothorax has a very slender posterior and lateral marginal ridge. Each elytron has two furrows; the first originating on one side of the scutellum and terminating in the apical angle, the second originating dorsally near the shoulder and terminating considerably before the apical angle; the interstice between these furrows has four distinct lines, which become obliterated before the apex. The head, prothorax, and elytra are thickly punctured, the punctures on the elytra requiring a lens of high power.

Inhabits the Cape of Good Hope. I am indebted to the Rev. F. W. Hope for the loan of one specimen, and to Mr. Westwood for that of another. The name of *carinata,* Klug, has long been attached to this species, but I am not aware of a previous description. Specifically this is distinct from the following, but I can discover no characters of distinction of higher importance than those of sculpture, which so obviously mark the species throughout the family.

Sp. 2. *Cato. castaneus.* (Corp. long. ·55 unc. lat. ·125 unc.)
Isonotus castaneus, Perty, 'Animal. Artic. of Brazil.' p. 114. tab. xxii. fig. 15.

Ferruginous, shining. Form less elongate than in *C. carinatus,* body scarcely so flat, and antennæ not so long in proportion to the body; the sculpture of the head exactly as in that species. Prothorax very shining, but under a lens of moderate power very obviously punctured; the disk is very flat

and has two obvious impressions. Each elytron has six furrows, united in pairs at the base; the fifth ceases at about half the length of the elytron; the sixth is rudimental only.

Inhabits Brazil. A single specimen is in the cabinet of the Rev. F. W. Hope, and three others in that of Mr. Children.

Sp. 3. *Cato. rufus.* (Corp. long. ·475 unc. lat. ·1 unc.)
,, *rufus*, Westwood, 'Zoological Journal,' vol. v. p. 215. Sup. tab. xlvi. fig. 2.
Cucujus rufus, Fabricius, 'Entomologia Systematica,' Supp. p. 123. No. 2.
,, ,, Fabricius, 'Systema Eleutheratorum,' vol. ii. p. 93.

This species so closely corresponds with the foregoing that I have considerable hesitation in considering them distinct. The present insect is rather less in size, rather less glabrous, and scarcely so broad in proportion to its length: there is again a difference of habitat, the *Cucujus rufus* of Fabricius inhabiting the United States, and the *Isonotus castaneus* of Perty inhabiting Brazil; and I may remark it is a circumstance of extremely rare occurrence that the same species is common to both countries. That the present insect is the *Cucujus rufus* of Fabricius appears pretty evident from that author's description, which I subjoin below. There is a specimen in the cabinet of the British Museum, a second in that of the Entomological Club (donor J. O. Westwood), and a third in that of Mr. Westwood, which is the identical specimen described by him in the 'Zoological Journal' as the type of his genus *Catogenus*, and which he has kindly placed in my hands for examination and description. It is useless to repeat the description already given with *C. castaneus*; the reader must refer to that species, notice the slight variation above alluded to, and add the following description from Fabricius in the 'Entomologia Systematica,' remembering also the different locality; a subject formerly so much neglected, that I find it a matter of difficulty to obtain the habitat of any rare species if it happen to boast of any antiquity.

Description of Cucujus rufus *by Fabricius.*

"*Cucujus* depressus, rufus, elytris striatis.

"Habitat in Carolina Dom. Bosc.

"Magnus in hoc genere. Antennæ corpore paullo breviores, crassæ, rufæ; articulis distinctis cylindricis. Caput rufum. Thorax planus, depressus, margine utrinque antice posticeque acutiusculo. Elytra striata. Pedes breves compressi."

Sp. 4. Cato. puncticollis. *Ferruginea, obscura; prothorax rugose punctatus, medio late depressus, linea mediana longitudinali glabra: singuli elytri striæ sex, exteriores indistinctæ.* (Corp. long. ·4 unc.; lat. ·1 unc.)

Ferruginous, with very little gloss. Form very short and stout, depressed, linear; antennæ hairy; head sculpture almost precisely as in the two preceding species. The prothorax is coarsely punctured, and has a large but shallow dorsal impression more rugosely punctured than the other parts, and through the middle of this passes a raised longitudinal glabrous line. Each elytron has six equidistant striæ, the two nearest the suture are united at the base: these, as well as the third and fourth, are clearly defined; the fifth and sixth are slight and indistinct.

Inhabits North America. The Rev. F. W. Hope, to whom I am indebted for the opportunity of describing this species, has labelled it "*rufus*, Fab." He possessed a second specimen, very much smaller, which he considers distinct.

XLVI.—*On the Existence of a Third Tunic, together with certain other peculiarities in the Structure of Pollen.* By Herbert Giraud, F.B.S.E., Mem. Med. Soc. Edin.

[With a Plate.]

In pursuing a series of observations on the structure and functions of pollen, some points of anatomical peculiarity have been presented to my notice which may not be wholly devoid of interest.

The existence of two membranes or tunics in the pollen-grain has long since been satisfactorily determined by Brongniart, Amici, and Brown, and is proved in a most decisive manner by the effects produced upon pollen by the action of sulphuric acid; for when immersed in the dilute acid, the pollen is seen to swell until suddenly a rupture takes place in the outer tunic, upon which, however, neither the fovilla

nor granules are emitted, but this outer membrane gradually removes from off the grain, which still retains its original figure, and incloses its contents as perfectly as ever. Instances of this kind of action are represented in Plate XVIII. Fig. 1. shows the pollen of *Fritillaria meleagris* with part of its outer tunic removed. Fig. 2. the pollen-grain wholly denuded of its outer tunic. Fig. 3. a portion of the outer tunic removed. Fig. 4. the pollen of *Lilium Martagon*, its outer tunic thin and transparent, rent and falling off. By employing this method, I have succeeded in detecting a third tunic in the pollen of *Crocus vernus*. When immersed in diluted sulphuric acid the pollen-grain swells (fig. 5.), its outer tunic bursts and is deciduous, as is represented at fig. 6. At this stage the next tunic, thin and transparent, may be clearly defined; but after a short interval, it expands, exposing within it a third tunic, which incloses the pollenic granules and fovilla (fig. 7.).

In examining the pollen of *Polemonium cœruleum*, immersed in water, with a power of about 500, the surface of the grains appeared studded with very minute and perfectly opake bodies, some of which left the grain, and floated in the water on the object-glass (fig. 8. *a.*). Upon looking more attentively at these bodies, I found that each possessed a spontaneous and independent motion, exactly similar to that possessed by the globules of the blood, or to that which Brongniart describes as having witnessed in the granules of the pollen of the Gourd and of the Mallow. Although I could detect no grains that had burst, still I supposed that these bodies might be the pollen granules, and that therefore this was merely a repetition of the observation of Brongniart. The pollen-grains being made to burst and emit their granules, an obvious distinction at once, between the latter and the minute bodies, became apparent. The true granules were larger than these bodies, from which they might also be distinguished by their translucency. Of the nature or uses of these bodies I have not been able to form even a conjecture; but that their motion is independent of all external agencies I feel quite satisfied.

Considerable doubt has existed as to the true nature of the longitudinal line which exists in most elliptical and spherical

pollen-grains possessing a smooth surface. It was supposed by Guillemin to be a slit in the outer tunic intended to facilitate the admission of water into the interior of the grains, and the emission of their fovilla. The observations which I have made in reference to this point have shown that the longitudinal line has not, in any case, the appearance of a slit, as it has greater opacity, when the grain is dry, than any other part; and were it a slit, it would not disappear under the action of water, (which is the case,) but, on the contrary, as the pollen-grain enlarged, it would become more patulous. It would therefore appear that the true nature of this linear marking is, that in the dry state the outer membrane is depressed and folded in, so as to form a furrow; but that when moisture is applied the grain swells, the fold is expanded, and finally disappears. This statement is confirmed by the appearances which I found to be presented by the pollen of *Antirrhinum majus.* In the dry state its form is cylindrical, but under the action of water it swells and becomes spherical; the furrow, at the same time, is seen gradually to unfold and at last to disappear (fig. 9, 10, 11, 12). Moreover, in the early stages of its development, when surrounded with fluid, and being therefore in a moist condition, no furrow is perceptible.

Besides the several proximate principles which have been shown by chemists to exist in pollen, I have succeeded in detecting in certain species a very marked quantity of carbonate of potassa. Whilst making an observation on the pollen of *Antirrhinum majus* immersed in dilute sulphuric acid, the field of the microscope became crowded with a quantity of acicular crystals. As the fluid gradually evaporated, the pollen-grains were found to act as nuclei, from which the crystals radiated in all directions (fig. 13.). Their form appeared to be that of quadrilateral prisms with obliquely truncated extremities. The portion of this salt was of course infinitely too small to afford a sufficient quantity for analysis; the only method therefore of determining its constitution was to discover the form of its crystal, and that of other salts which might be formed by its decomposition. It was obvious that it must be a sulphate of some base; and as potassa is an

abundant base in some of the other vegetable tissues, it was probable that this salt was sulphate of potassa. On comparing the form of microscopic crystals of sulphate of potassa with that of the crystals derived from the pollen, it was found that they were identical; but in order to determine this point with greater certainty, a solution of oxalic acid was added to the pollenic crystals, which upon evaporation afforded crystals having the characteristic form of the binoxalate of potassa (fig. 14.). That the potassa existed in the state of carbonate became probable from the fact, that the water in which the pollen had been macerated did not yield crystals upon a partial evaporation, the carbonate of potassa being deliquescent.

Note.—Although the main object of this communication has been anticipated by M. Fritzsche, of whose labours, published in the Transactions of the Petersburgh Academy, our correspondent seems to have had no knowledge, it will prove interesting to many of our readers, inasmuch as the writings of Fritzsche are little known in this country, and his views are in some degree confirmed by the observations of our correspondent, both agreeing in their deductions. M. Fritzsche has not only discovered a third tunic, but even a fourth, which is said to occur, among other plants, in *Clarkia elegans*, some species of *Œnothera*, and in *Encharidium concinnu.*—Edit.

XLVII.—*Observations on several British Fishes, including the description of a New Species.* By William Thompson, Esq., Vice-President of the Natural History Society of Belfast*.

[With a Plate.]

1. *On the British Species of the Genus* Monochirus, *Cuv.*

By the kindness of Dr. Parnell in supplying me with specimens of the Red-backed Flounder of Hanmer, 'Pennant's Brit. Zool.,' (v. iii. p. 313. pl. 48. ed. 1812,) and the *Mon. minutus*, Parn., I am enabled to speak decidedly on some points which, in my previous remarks on these species, 'Annals Nat.

* Read before this Society December 5, 1838, and illustrated by the specimens of which it treated.

Hist.,' vol. ii. p. 19, could only, from a want of specimens, be treated of problematically. This I now proceed to do as supplementary to what appeared in the 'Annals;' but it may be well, in the first place, to give a slight sketch of the British *Monochiri*, in so far as our present knowledge extends.

The first British *Monochirus* I am aware of being noticed, is that figured under the name of Variegated Sole in 'Donovan's British Fishes,' (pl. 117,) the individual represented having been purchased in the London market in April 1807, but where captured is not mentioned. In the edition of Pennant's 'British Zoology' published in 1812, Mr. Hanmer figured and described a species by the appellation of Red-backed Flounder, and stated it to be "common in the spring upon the coast near Plymouth." In the sixth volume of the 'Magazine of Natural History,' p. 530, a specimen of "*Solea variegata*" is noticed by Dr. Scouler to have been taken at Rothsay in the isle of Bute. Mr. Jenyns, in his 'Manual of British Vertebrate Animals,' p. 468, takes his description from one procured at Weymouth; and Mr. Yarrell, in his 'History of British Fishes,' v. ii. p. 262, figures and describes an individual supplied from Cornwall by Mr. Couch, and mentions, in addition, from the MS. of Montagu, that this naturalist received a specimen 9 inches in length from Dr. Leach, who purchased it with two others in Plymouth market in August 1808. Thus far our authors, with the exception of Mr. Jenyns, (who leaves it to be proved by future investigation whether there be not a second species,) speak only of one *Monochirus*.

In the first volume of the 'Magazine of Zoology and Botany,' p. 526, Dr. Parnell described a *Monochirus*, which is taken at Brixham, under the specific name of *minutus*, introducing it doubtfully as a new species, but with certainty as distinct from the "red-backed Sole, *Mon. Lingula*," and, as such, an addition to the British Fauna. Lastly, the September number of the 'Annals' contains observations by myself on two species of *Monochirus* taken on the coast of Ireland.

To attempt placing the species, of which notices are here brought together, in a clearer light, is the object of the present communication; and although this may to a certain ex-

tent be done, the sequel will show that it cannot be performed effectively.

First:—the Variegated Sole as figured and described by Donovan and Yarrell, the specimen recorded by Dr. Scouler*, and the individual noticed by myself under the name of *Solea variegata*, are identical. The localities in which this species has been procured, are the coasts of Cornwall in England, of the island of Bute in Scotland, and of Down in Ireland. As suggested in my previous paper on this subject, it may be worthy of investigation, whether the *Mon. Pegusa* of Risso, obtained from the Mediterranean, be this species, (t. iii. p. 258. f. 33. ed. 1826) †. Of the references in Mr. Yarrell's work, those relating to Rondeletius, Willughby and Cuvier apply, I conceive, to the species next to be noticed; Duhamel I have not for consultation; Fleming merely quotes Donovan and Pennant.

Spec. char. *Mon. variegatus.* Pectoral fin about $\frac{1}{4}$ the length of head: scales on lateral line about 85; dorsal and anal unconnected with caudal fin.

Secondly:—the *Solea Lingula* of Jenyns's 'Manual,' (excepting the short specific characters and colours which are copied from Hanmer,) the *Mon. minutus* of Parnell, and the "*Solea Lingula*, Rond.," (*Mon. linguatulus*) described by me in the 'Annals,' are the same species;—of the identity of these two last I judge from a comparison of specimens. Being of opinion that Mr. Jenyns's description, so far as taken from the individual before him, related to this species; and that, rather than describe the colours from a specimen preserved in spirits, he had copied them from Hanmer's description of the Red-backed Flounder, believing it the same, though it is in reality a distinct species; I communicated with him on the subject, and his reply confirmed my views. The opportunity of examining specimens of this latter fish, which Mr. Jenyns had not, but through the kindness of Dr. Parnell

* As this fish is very briefly noticed in the Magazine, I wrote to Dr. Scouler respecting it, and was informed in reply that it may be considered identical with the Variegated Sole of Yarrell.

† The large size of the pectoral fin, as represented in the figure, marks a *Solea* rather than a *Monochirus*; but it is described as the latter by Risso, and the figure referred to as such by Cuvier, Règ. An., t. ii. p. 343, 2nd ed.

I have had, could alone have settled this point, the describer of it having been silent on such characters as the length of the pectoral fins, and number of scales on the lateral line, by which chiefly it is distinguished from the present species.

This is, I consider, the *Solea parva sive Lingula* described and figured by Rondeletius, and again repeated in the works of Gesner (lib. iv. p. 669.), Aldrovandus (p. 237.) and Willughby (p. 102. pl. F. 8. f. 1.). With reference to this, the following note on three specimens obtained since the publication of my paper in the 'Annals' may be here given. Of these, which are from 3 to 3½ inches in length, one has the outline of *Solea vulgaris;* but the other two differ much from it in being narrower, and tapering more towards the tail, thus precisely resembling, even to the turn of the caudal fin, the *Solea parva sive Lingula* as represented by these authors: the lateral line too approximates the form given in the figure of this species, but in the specimens is placed rather higher on the body; in these it originates considerably above the middle, and for some way slopes gradually downwards, until it takes a course midway between the dorsal and ventral profile*. A figure of this fish illustrates Dr. Parnell's paper before referred to in the first volume of the 'Magazine of Zoology and Botany.'

The two localities in which this species has occurred in England are southern: at Weymouth in Dorsetshire, whence the single specimen was obtained that served for Mr. Jenyns's description; and at Brixham on the adjoining coast of Devonshire, where, Dr. Parnell informs us, it is taken in the trawl-nets throughout the year. In Ireland it has been procured with the trawl or dredge both in the north and south; in the month of August in the open sea off Dundrum, county of Down; in June and October within the entrance to Belfast bay, and at Youghal in the county of Cork. (See Annals, *loc. cit.*) Of its occurrence in Scotland I have not seen any record. This is described to be a Mediterranean species.

Spec. char. *Mon. linguatulus.* Upper pectoral fin about

* These specimens may further be described as of a red lish-brown colour, minutely freckled over with a darker shade, and having the roundish spots of dark brown and of white on the lateral line and on the body some way inwards from the base of the dorsal and anal fins, as had the individuals obtained in June last. See Annals, vol. ii. p. 21.

one-seventh the length of head; scales on lateral line about 70; an occasional black ray throughout the dorsal and anal fins, this colour not spreading over the adjoining membrane.

Thus far all seems clear, the British specimens recorded being allocated under the two species just treated of, with the exception of Hanmer's Red-backed Flounder obtained at Plymouth, and Montagu's specimen from the same locality. All that is wanted to fix the species of the first-mentioned is an examination of a moderate-sized *Mon. variegatus.* This Mr. Yarrell possesses; and now supplying him with the specimens by which I arrived at the above conclusions, I leave this point to be determined in the forthcoming Supplement to his 'History of British Fishes.' As all the British *Monochiri* and *Soleæ* are taken on the southern coast of England, it signifies little to which of the species Montagu's specimen belonged.

It may not be useless to mention some of the comparative differences between Hanmer's Red-backed Flounder, (of which two specimens, procured by Dr. Parnell at Brixham*, are now before me,) the *Mon. linguatulus* and *Mon. variegatus.* From the *M. linguatulus* it is at once seen to be specifically different, by the greater length of its pectoral fin, (about $\frac{1}{4}$ that of head, whereas it is about one-seventh in the other,) by its smaller scales (about 85 in the lateral line, the other having about 70), and by the conspicuous blotches of black, of which part is on the dorsal and anal fins, and part on the body of the specimens†. With *M. variegatus* the Red-backed Flounder accords in the length of pectoral fins, the number of scales on the lateral line, and in general form; in every character indeed, so far as I can judge from comparison with a specimen of *M. variegatus* under three inches in length, except in colour. This difference, in itself certainly not specific, is nevertheless very striking; my specimen of *M. variegatus,* $2\frac{3}{4}$ inches long, Mr. Yarrell's 5 inches, and Donovan's 9 inches

* It was between these or similar specimens that Dr. Parnell, calling them *Mon. Lingula,* clearly showed the characters in which they differed from his *Mon. minutus.* See Mag. of Zool. and Bot., vol. i. p. 528.

† The black spots mentioned in my description of the colours of *Sol. Lingula,* Rond. (Annals, *loc. cit.*), differ entirely from these by appearing on the *body only*; they are small roundish spots, generally about a line in diameter.

in length, all presenting similar variegated markings. The colour of the upper side of Hanmer's fish is described to be "a very light brown tinged with red," and is figured of a uniform colour. Such Dr. Parnell's (preserved dry) likewise are, becoming darker at the margin, over which the black blotches on the dorsal and anal fins occasionally extend for a few lines: this marking, as represented in Hanmer's figure, is characteristic of that in the specimens at present under examination; but these exhibit rather more black on the dorsal fin. Hanmer's specimen was $6\frac{3}{4}$ inches long, Dr. Parnell's are $7\frac{1}{4}$ and $8\frac{3}{4}$ inches.

The number of denticles and form of the scales of the *Monochiri* will not prove to be a positive character, though, relatively considered, they may be of service in the elucidation of species. On examining one of my specimens of *M. linguatulus* as to the number of these denticles, I found that a scale taken from the lateral line had 21; another from the next row had 22 and 2 rudimentary points; a third from an adjacent part of the body had likewise 22. The outline of these scales was different, the first being conspicuously contracted about the middle at one side, and straight throughout the other; the second slightly contracted about the middle on both sides, and the third with the sides quite straight. In each of two scales taken from the lateral line of Dr. Parnell's specimen of *M. minutus* there are 22 large strong denticles, with rudimentary points between them: outline of these scales different, and as in the individual just described. In my specimen of *M. variegatus*, two scales which touched upon the lateral line exhibited only 10 and 13 points; but this paucity may be owing to its diminutive size. A scale from the lateral line of Dr. Parnell's smaller specimen of the Red-backed Flounder exhibited 19 denticles, one off the third row from it 18. The form of scale in all the individuals examined is much the same, being broader for its length than that of scales I took from *Solea vulgaris*; they were generally, but not always, contracted about the middle, either at one or both sides. The scales were all examined *separately* under the microscope, and hence is a different result in the number of denticles from what would have appeared, had they been reckoned on the body of the fish.

II. *Description of a minute Fish allied to the* Ciliata glauca, *Couch, and* Gadus argenteolus, *Mont.* Plate XVI. figs. 1, 2, 3.

When dredging in Strangford Lough, county of Down, on the 2nd of July last, at from one to three quarters of a mile off the shore, and the water from ten to twenty fathoms in depth, I for upwards of an hour remarked some very minute fishes coming singly to the surface. They ascended in a somewhat vertical direction, remained but momentarily there, and again, generally in a similar manner, descended until lost to view. Their back appeared to be of a dark colour, but their sides presented the brilliancy of the brightest silver. Their size was rather under an inch; their motion, though somewhat wriggling, surprisingly rapid; so much so, that although the boat was scarcely moving, and the sea quite calm, their continuance at the surface was so short, that the greatest activity had to be exerted to secure them. For this purpose a small canvas net, otherwise used in the capture of minute *Medusæ*, was available. When brought into the boat, they at first sight called to mind the *Ciliata glauca* and *Gadus argenteolus*; but the great size of the ventral fins, which were likewise of a pitchy blackness for nearly the last third of their length, seemed opposed to their identity with these species. The boatmen who accompanied me had not observed this fish before, nor had they heard anything of it.

Desc.—General form elongate; belly protuberant. On a close examination of all the specimens, nine in number, no cirri can with a high power of lens, or on the field of the microscope, be detected on either jaw. The largest individual, $10\frac{1}{2}$ lines in length, may be characterised as having the upper jaw the longer; strong and pointed teeth in both jaws; head occupying rather more than $\frac{1}{4}$ of the entire length: eye equal in diameter to $\frac{1}{3}$rd the length of head: opercle rounded at the base, altogether forming a portion of a circle: first dorsal fin originating just over the opercle, so sunken, and its rays (which are thick and blunt) so short, as to be hardly distinguishable in the profile of the fish, not less than 25 rays; second dorsal commencing close to the first, and before the end of the pectorals, of unequal height, extending to the base of the caudal, not less than 50 rays: pectoral fins rather less than $\frac{1}{5}$th of the entire length, of moderate size and rounded, placed very high, somewhat above the

opercle, about 20 rays; ventrals placed high, commencing rather in advance of the pectorals, somewhat square at the end, occupying $\frac{1}{4}$ of the entire length, reaching to the vent, and consisting of about 6 rays: anal fin commencing at the vent, and extending to the base of the caudal, unequal in height, having at least 40 rays: caudal fin elongate, occupying $\frac{1}{5}$th of the entire length (measured from last vertebra of body), somewhat rounded at the end, containing about 30 rays*: branchial rays about 7: vent midway between snout and base of caudal fin. Colour when recent —: back, rich green varied with dots of gold and black: operculum, entire sides and under surface bright silver; pectoral, dorsal, anal and caudal fins uniformly of a pale colour, ventrals likewise so for $\frac{2}{3}$rds from the base, remainder pitch black; irides silvery.

Since the above was written, I have been favoured by Mr. Yarrell with original specimens of *Ciliata glauca*, obtained from Mr. Couch, and from these the Strangford species differs as follows. My specimens, under 11 lines in length, do not, like the Cornwall fish—which is 1 inch 5 lines long—exhibit cirri on either jaw. The ventral fins in mine are equal to $\frac{1}{4}$th of the entire length, in the English specimen to about $\frac{1}{7}$th; in the latter the longest rays have a fibrous termination, (to the extreme of which the length of the fin was estimated,) whereas these fins are somewhat square at the end in the Strangford specimens; besides, they are in these of a pitchy blackness for the last third of their length, although in the other of a uniform pale colour throughout. These differences were likewise constant in Cornwall and Strangford specimens of similar length.

On placing the authentic *Ciliata glauca* and a *Motella quinquecirrata*† of equal size together, the difference is very great;

* Although the number of rays in the fins cannot be given with certainty, an approximation to it has been thought better than entire silence on the subject.

† One of the two individuals which, judging from their agreement with the characters assigned to *C. glauca*, were noticed as such in the Annals for September last (p. 14), at which time I had not seen authentic specimens. In colour there certainly was a want of uniformity with the description; but it was considered that this might have been changed by the preserving liquor. Compared with the figures of Couch and Yarrell, (chiefly owing to their being uncoloured,) no obvious difference appeared. By the accompanying coloured figures, though taken from specimens long preserved in spirits, I have endeavoured to show this difference; in such small representations it is almost impossible to give more than the general aspect of the fish.

the dull hue of the latter presenting quite a contrast to the colour of the other, which is of as brilliant a silver as any of the *Clupeiadæ*. Its general organization too is much more delicate than that of the *Motella*: in the form of the head they are different; in *C. glauca*, the separating line between the opercle and pre-opercle, both of which are silvery and somewhat hard, is conspicuously marked; in the *Motella* the opercle appears *exteriorly* undivided, in consequence of its soft and fleshy covering. The snout of *C. glauca* is shorter than that of the other, and the mouth smaller; this is differently formed from that either of a *Motella* or *Clupea*, but possesses numerous sharp and curved teeth along both jaws. Its rictus is in a line with the first third of the eye; that of the *M. quinquecirrata* with its posterior margin. No pores are apparent within the posterior line of the opercle, as in the species just named, but a row of them surmounting the upper lip. The difference in the ventral profile is considerable, all the specimens of *C. glauca* being, from the protuberance of the belly, very convex anteriorly,—an appearance which the *Motella* does not present.

When announcing this species in the 'Magazine of Natural History,' (vol. v. p. 15) Mr. Couch founded a new genus upon it, which he called *Ciliata*; but subsequently, in the works of Mr. Jenyns and Mr. Yarrell, it appeared as a *Motella*. Although its possessing the very few characters assigned to this genus may be considered sufficient to place this fish under it, the comparison of specimens, of which the result has been given, induces me to think that it should constitute a new genus. It participates in the characters both of *Clupea* and *Motella*, resembling the former in its silvery brilliancy*, and in almost instantly dying on removal from the water (which the latter genus can long survive): its *form*, posterior to the head, is precisely that of *Motella*, with which it likewise accords in possessing cirri. In selecting a generic name, that of *Ciliata* should, by reason of its priority, be adopted, were it not pre-engaged†. Such being the case, I propose,

* It has a metallic appearance, as if covered with silver-leaf, wholly unlike the silvery whiteness of the lower portion of the body in some of the *Gadidæ*, as *Gad. minutus*, *Merlangus vulgaris*, &c.

† *Ciliés*, which may, I think, be considered equivalent to *Ciliata*, though

as a compliment well merited by Mr. Couch for his practical knowledge of fishes, that the genus be named after him, *Couchia.* To the Strangford species the name of *minor* may be given.

Generic characters.—Couchia. Body elongate, compressed posteriorly: first dorsal fin, like that of *Motella,* very low, composed of soft rays unconnected by a membrane: pectorals and ventrals placed high: second dorsal and anal fin long: divisions of opercle well defined exteriorly.

Specific characters.—Couchia minor. (Plate XVI. fig. 1.) Lesser Mackerel Midge. Upper jaw the longer: ventrals long (from $\frac{1}{4}$ to $\frac{1}{5}$th the length of head), and black at their termination: sides silvery*.

The *Gadus argenteolus* (Pl. XVI. fig. 2.) of Montagu 'Wern Mem.', v. ii. p. 449. must be adverted to in connexion with the present species. By its describer, it is stated to be "nearly allied to the three-bearded Cod, *Gadus Mustela,* in most particulars; but the shape of the head and the colour† are essentially different." It was the striking dissimilarity presented by a comparison of specimens of *C. glauca* and *Mot. quinquecirrata* in these very characters, that led me to re-separate them generically; and consequently the *C. glauca* and *G. argenteolus* may, from agreement in these points, be in the first place regarded of the same genus‡ as here defined. On

I know not whether this term itself has been used, appears, from Jourdan's 'Dict. des Termes,' &c., to have been adopted in a somewhat similar sense by four different authors.

* The absence of cirri is not given as a character, as better vision than mine may yet detect them.

† The name of *Whitebait* (*Clupea alba*), which Montagu mentions as applied to the *G. argenteolus* by the fishermen, however erroneously, is sufficiently indicative of its Clupea-like aspect.

‡ Montagu remarks of the *G. argenteolus,* that "the whole fish is of a silvery resplendence except the back, which is blue changeable to dark green;" and that the three-bearded Cod he has "taken of all sizes, from the most minute to its full growth of 16 or 17 inches, and never observed it to vary in colour, except as it grows large it becomes more rufous, and throws out spots, which is never observed till it exceeds 6 or 7 inches, but is invariably rufous-brown in its infant state." As a general description, this is equally applicable to the five-bearded Cod (*Mot. quinquecirrata*), of which I have however taken spotted examples smaller than has been just noticed. Specimens now before me of different sizes, from $1\frac{1}{4}$ to $5\frac{1}{2}$ inches in length, are of a tolerably uniform brown colour on the head, back, sides and fins, varied only in the larger individuals by yellowish white at the an-

looking critically to the detailed description of *G. argenteolus* (fig. 2.), and applying it to the authentic specimen of *C. glauca*, Pl. XVI. fig. 3, there is, with one exception, such a similarity in every character which may be comprised under *form* and *colour*, that I am fully persuaded they constitute but one species. The single discrepancy, like to a specific one, is that of three cirri only being attributed to *G. argenteolus*; but as it is much more easy to overlook two than to distinguish all the cirri*, I cannot under the circumstances, and at the same time not forgetting Montagu's great accuracy in description, consider this alone a sufficient reason for separation. The localities too, in which only the *G. argenteolus* and *C. glauca* are hitherto recorded to have occurred, tend further to favour this view; by Montagu the first mentioned was obtained on the south coast of Devonshire, where it has not since been observed; but by Mr. Couch the latter was some time afterwards procured on the adjoining shores of Cornwall. It is in the present communication that the range of this genus is for the first time shown to extend beyond the south-west of England. Finally, with a full belief of the identity of Montagu's and Couch's fishes, although they have hitherto been regarded by naturalists without any specific reference to each other, I would suggest that the name applied by the former author should be retained, and that *Couchia argenteola* be applied to the species.

Specific characters.—Couchia argenteola. Upper jaw the longer, 5 cirri, four on the upper, one on the lower jaw: ventrals moderate (from $\frac{1}{6}$ to $\frac{1}{7}$ the length of head), and of a whitish colour: sides silvery.

terior part of the under surface of the body, and in the smaller by the white extending to the lower portion of the opercle, and here, as well as beneath, faintly tinged with silver.

* As before stated, cirri could not be detected in any of the Strangford specimens: lest this should be owing to want of discrimination on my own part, they were submitted to two scientific friends who are well accustomed to the use of the microscope; but neither could they detect any cirri under it, nor with the aid of a lens: the specimens, it must be remembered, were small. It is only by very close examination that four cirri can be perceived on the upper jaw of the large English *C. glauca*. "Cirri three, two before the nostrils and one on the skin," are Montagu's words, leaving us in doubt on which jaw he perceived the third cirrus.

III. *On the identity of the* Trigla Cuculus, *Bl., with the* T. Gurnardus *of authors; together with Observations on two Species of the Genus* Gobius.

When noticing the *T. Cuculus* as an addition to the Fauna of Ireland, in the first volume of the 'Annals'* (p. 348), I embraced the opportunity of offering some remarks on the confusion that existed about the species. In so far, the observations then made may not be useless; but as it was looked upon in the ordinary light of being a species distinct from *T. Gurnardus*, of which it has very recently been shown to be merely the young, I feel that a few notes are requisite as supplementary.

In a paper on some species of British fishes read by Dr. Parnell before the meeting of the British Association at Newcastle, the author stated that an examination of a series of specimens, embracing all sizes, had led him to the conclusion that *T. Cuculus*, Bl., (*T. Blochii*, Yarr.) is only the young of *T. Gurnardus*; and to him alone, I believe, is this highly interesting discovery due, for such, in consequence of the manner in which it is effected, I conceive it to be†. Having lately procured a series of specimens, that I might, for my own satisfaction, examine into this question, I shall here give the results. The following extract from the 'Histoire Naturelle des Poissons' of Cuvier and Valenciennes, by whom they are considered as distinct species, may in the first place be desirable. "Leur tête est la même, ses granulations sont semblables, les dentelures des lobes de leur museau sont tout

* One oversight was here committed. Mr. Jenyns is mentioned in company with other authors as not having described the relative length of the first and second rays of the first D. fin to each other; but although this is not alluded to in his 'Manual' under the head of *T. Cuculus* (a circumstance which led to the remark), the relative differences only between this species and *T. Gurnardus* being described, rendered any observation on this point unnecessary, when a similarity was considered to prevail in this character. For a similar reason Cuv. and Val. did not particularize the relative length of these rays.

† In the number of specimens of each species, independently of the beautiful manner in which they are preserved, Dr. Parnell's collection of British fishes stands quite unrivalled. In these *Triglæ* is a notable instance of the advantage of a series of different sizes, the young and old fish being so different, that without having traced the changes from youth upwards, we could hardly believe in the modification which really takes place.

aussi distinctes, et les points de leurs pièces operculaires et de leur épaule tout aussi aiguës; mais les trois premières épines de leur dorsale n'ont pas, comme dans le gurnard gris, les côtés granulés ou chagrinés: on ne voit qu'une dentelure à peine perceptible sur le tranchant antérieur des deux premières. Les crêtes des écailles qui garnissent leur fossette dorsale sont entières et sans crénelures, et se terminent chacune par une simple pointe. Celles des écailles de leur ligne latérale ne sont pas non plus crénelées comme dans les gurnards gris, mais ont deux à trois dents de scie, dont une est plus saillante et plus aiguë que les autres. Tout le reste est parfaitement conformé de même dans les deux espèces."—Article *T. Cuculus*, tome iv. p. 68.

T. Cuculus.

No. 1. = $2\frac{1}{2}$ inches long. Colour red, "with a conspicuous black spot on the upper part of the first dorsal," extending from the 3rd to the 5th ray. A few denticles on the 1st D. ray only; all the scales on the D. ridge entire, each being a sharp spine directed backwards; scales of the lateral line not crenated, but consisting of a series of hooked spines similarly directed.

Nos. 2. and 3.* = 3 and $3\frac{1}{2}$ inches long. Colour red, a conspicuous black spot from 3rd to 5th ray of 1st D. fin. Scales of D. ridge and lateral line as in No. 1; no denticles on D. rays in No. 2; the rays in No. 3. imperfect.

Intermediate between T. Cuculus *and* T. Gurnardus.

No. 4. = 7 inches long. Colour dark grey, black spot of 1st D. fin very conspicuous. Two anterior scales of D. ridge slightly denticulated, the remainder simple; scales occupying the anterior part of lateral line for about an inch in extent, crenated; remainder as in Nos. 1.—3.: first D. ray denticulated, and to a greater extent than in No. 1.

No. 5. = 9 inches long. Male, colour greyish-red, a conspicuous black spot on 1st D. fin. The few anterior scales only of the D. ridge slightly denticulated; anterior portion of every scale on the lateral line crenated, but each terminating in a hooked spine: 1st and 2nd D. rays denticulated, points on the 1st increasing in number†.

* The specimens described as *T. Cuculus* in the 'Annals,' vol. i. 348.

† Since this was procured, Dr. Parnell has favoured me with a specimen of similar size, and which, being in the transition state, admirably shows the characters of both species.

T. Gurnardus.

No. 6. = 11 inches long. Female, colour blackish-grey, a black spot on D. fin. Scales on D. ridge all crenated, points directed upwards; those on the lateral line all crenated, occasional scales throughout its length terminating in a hooked spine, 3 anterior D. rays crenated.

No. 7. = 11½ inches long. Male, colour greyish-red, black spot on 1st D. fin. Scales throughout D. ridge crenated, but nearly all of them having the terminal hooked spine; scales on lateral line all crenated, but, as in the D. scales, all except those occupying the anterior inch terminated by a spine; 1st and 2nd anterior rays only of 1st D. granulated.

No. 8. = 13½ inches long. Colour blackish-grey, with a slight tinge of pale-red over it; 1st D. fin generally dusky. Scales of D. ridge crenated, all the points directed upwards; scales throughout lateral line crenated, many of them on the hinder ⅔rds of its length terminating in a spine; 1st 3 D. rays granulated throughout almost their entire length; 4th and 5th rays partially granulated.

No. 9. = 13½ inches long. Female, colour dark-grey, varied with yellow; D. fin generally blackish, but of a darker hue where the black spot usually occurs. Scales on D. ridge crenated throughout, points directed upwards; D. scales as in No. 8.; 1st and 2nd D. rays granulated nearly throughout their length, 3rd and 4th slightly so about the middle.

No. 10 = 14 inches long. Female, colour grey, varied with yellow, 1st D. fin with a black spot. Scales on D. ridge and lateral line as in last, four anterior rays of 1st D. fin conspicuously granulated, 5th partially so about the middle.

No. 11 = 15 inches long. Female, colour dark-grey, varied by yellow; 1st D. fin generally, pale dusky*. Scales on D. ridge and lateral line as in last; 3 anterior rays of 1st D. fin strongly granulated throughout almost their entire length, 4th and 5th granulated for more than half their length; 6th granulated on one side. No. 6., 11 inches long, was considerably darker in colour than the three last.

Thus the *T. Cuculus* may be traced gradually passing into the *T. Gurnardus,* until this species appears fully developed. It may further be perceived, that as this fish increases in size, the granulations extend over the rays of the first dorsal fin, and are not confined, as described by authors, to the three or

* The recent colours of all but Nos. 1–3 are here given.

four anterior ones only. So far as my observation extends, the red colour assigned to the *T. Cuculus* is not peculiar to the species at any age; and individuals of this hue may be looked upon as occasional varieties:—from 2½ up to 12½* inches in length, I have seen specimens of a reddish colour. Considered relatively to the length of body, the pectoral fins are larger in young than in adult individuals; in those of considerable size they often extend so far as to be on a line with the vent.

The Grey Gurnard, commonly known by the name of *knoud* in the north, is a common species on the Irish coast: specimens from the northern, eastern, and southern shores are in my possession. It is chiefly taken in the summer and autumn; to Belfast market it is sometimes brought from the beginning of March until the end of October. Not being in much favour for the table with those who can afford a choice, it becomes a cheap food to the poorer people.

At Dundrum, on the coast of Down, where I have seen it captured, sand-eels and the fat of meat were successfully used as bait; and once, in my presence, a slice taken off the side of one the moment it was brought into the boat, had hardly reached the bottom before another was taken with it; this I learned was a common bait. The food that has generally occurred to me in their stomachs was crustacea and small fishes, chiefly of a silvery colour, as *Ammodytes* and *Clupea*. The Grey Gurnard, when taken from the water, emits before dying a kind of snoring noise like others of the genus, and hence the name of Piper bestowed on *T. Lyra*.

Gobius niger, Cuv. and Val.? and *G. Britannicus*, Thomp.

When recording a species of Goby in 1837† as new to the British Fauna, I stated my opinion, judging merely from description, that it was the species described as *G. niger* by Cuv.

* This specimen may be described as tinged with red over the ordinary grey colour which appears on the back and upper part of the sides in *T. Gurnardus*; on the lower part of the sides, and to near the ventral profile, it was of a deep rose colour; all the fins too had reddish markings.

† See 'Proceedings of Zool. Soc. of London,' 1837, p. 61. The *G. niger*, Cuv. and Val. is the addition to the Fauna; *Britannicus* is applied to the *G. niger* of Mont., &c. The reasons for this allocation of names are fully stated in the work just cited, p. 63.

and Val. 'Hist. des Pois.,' t. xii. p. 9, and that it was at the same time distinct from the *G. niger* of Montagu 'Yarr. Brit. Fish.,' v. i. p. 252, and Jenyns, and probably from that of Yarrell. Of the former species I had then seen but the one native specimen—captured by myself in the bay of Galway—and therefore it was considered injudicious to draw up the specific characters. Having now obtained from Mr. R. Ball of Dublin two other specimens for examination—from the coasts of Galway and Cork—I can do so with more confidence. Although an easy task to point out the relative differences, it is not so with the absolute characters; these may be described as

G. niger, Cuv. and Val. ?	*G. Britannicus.*
Teeth on the outer rows of both jaws very much larger than the others, and curving inwards.	*Teeth* of the outer rows not very much larger than the others, and, like them, straight and truncated at the summits.
Scales small, with long cilia on their free margins.	*Scales* rather large.
D. 6—16; P. 20; V. 5 each; A. 13; C. 14, and some short.	D. 6—14; P. 18; V. 1+5 each; A. 12; C. 15, and some short*.

On comparison, the largest *G. niger*, Cuv. and Val., 3 inches 2 lines long, and the *G. Britannicus*, 3 inches in length, present the following appearances:—

Viewed from above, the head is more equable in breadth in *G. Britannicus*; in the other it approaches more to a conical form. When placed on the side, the *G. niger* is rather the deeper, carrying greater breadth to the base of the caudal fin; the scales are much smaller in *G. niger*, yet the *cilia* on their margins are longer than in the other: from some of the scales being wanting, their number cannot be accurately given; but reckoned from the opercle in a straight line along the middle of the body—for the lateral line is inconspicuous in both species—to the base of the caudal fin, there are about 10 more in *G. niger* than in *G. Britannicus*; about 45 in the one, and 55 in the other may be mentioned as an approximation: pecten-like striæ† on the scales of both species. In *G. niger*, the outer row of

* The examination of more specimens has shown that there is but little disparity between these species in the dorsal sulcus and the comparative length of jaws, although a difference did, in these respects, appear in the individuals first compared (See Zool. Proc.). The jaws may in both be called equal. Of four specimens of *G. niger*, one had a more depressed line from the head to the first dorsal, another a broad groove, and the remaining two displayed neither appearance.

† See Cuv. and Val., t. xii. p. 12.

teeth in both jaws is considerably the largest, and they differ entirely in form from those of *G. Britannicus*, this being the most obvious differential character between the species; of the large hooked teeth, there are about 16 in the outer row of each jaw; no teeth apparent either on vomer or tongue*: in addition to the very numerous card-like teeth in both jaws of *G. Britannicus*, the anterior part of the vomer is paved with them; on the tongue none are apparent†. The dorsal fins contiguous in both, the 2nd D. is obviously higher than the 1st in *G. niger* than in *G. Britannicus*, as in the latter the two or three longest rays are equal to the general length of those in the 2nd D., a size which they do not attain in *G. niger*. In *colour* these specimens differ considerably, (but in this we need not look for constancy,) the *G. niger*, from the general blackish or dusky hue of the body and fins, (these much darker than in its congener,) well meriting its specific name: along the base it is of a dull yellow (in other specimens pale lilac-grey): the general hue of the *G. Britannicus* is much lighter and more varied, the head, body above, and a short way beneath the lateral line marbled with yellow and brown, and points of black scattered along the lateral line; yellowish on the under parts.

IV. *On the identity of* Crenilabrus multidentatus, *Thomp., and* Labrus pusillus, *Jenyns: with Notes on the Irish* Coregoni.

In the month of June 1837, I with some doubt characterized a *Crenilabrus* as new, under the specific name of *multidentatus* (Proc. Zool. Soc., 1837, p. 56), and subsequently gave a more detailed account of it, 'Mag. Zool. and Bot.,' v. ii. p. 449. From the species possessing some of the principal characters of *Lab. pusillus*, I lately felt desirous of comparing specimens of this fish with mine; and for this purpose Mr. Yarrell very obligingly forwarded to Belfast, for my examination, the only specimen of it he possessed, and which is one of the original individuals described by Mr. Jenyns. A com-

* Cuv. and Val. thus describe the teeth: "Chaque mâchoire a une large bande de dents en *crochets*, qui dépassent les autres, et dont on compte 18 ou 20 à chaque mâchoire," t. xii. p. 10. The similarity in the teeth chiefly led me to believe this species and mine to be identical.

† Montagu remarks of the teeth, that "the under jaw is roughened by them like a rasp." Mr. Yarrell describes the lower jaw "with fine carding-like teeth in several rows" (v. i. p. 253). Mr. Jenyns notes "fine card-like teeth in several rows, the inner rows much smaller than the outer," p. 385.

parison of this specimen, $2\frac{1}{4}$ inches in length, with my own, proved the species to be the same.

It must be stated that *C. multidentatus* was not considered a distinct species, without even critical attention having been given to the description of *L. pusillus*. The following are the chief differences that led to the belief of their non-identity.

C. multidentatus.	*L. pusillus.*
"*Teeth* numerous and large, *two* rows in the upper, one in the lower jaw, number in lower 26, outer row of upper jaw 20*.	"*Teeth* of moderate size, conical, regular, about 16 or 18 in each jaw.
Upper *jaw* the longer†.	*Jaws* equal.
Colour (in spirits) very pale greenish brown on the back, olive-green on the sides becoming paler beneath, sides with darker *longitudinal* bands throughout; 3 blackish spots, one on the pre-opercle behind and rather below the centre of the eye, a second on the body at the base of the caudal fin and at its lowermost portion, and the third at the base of the last ray of the dorsal fin."	*Colour* (in spirits) yellowish-brown, with irregular *transverse* fuscous bands: dorsal irregularly spotted with fuscous: anal light brown; the other fins pale."

Mr. Yarrell's specimen, which is in excellent preservation, has no appearance whatever of transverse fuscous bands, like the individual described by Mr. Jenyns:—it is also free from spots, thus differing again from mine‡.

When looking over Mr. R. Ball's collection of native fishes in June last, I had the pleasure of seeing among them a *Crenilabrus*, which accorded better, in some respects, with Mr. Jenyns' description of *L. pusillus* than the smaller specimens, and, compared with them, differed in several points of view to be hereafter noticed.

* My specimens, with the teeth more numerous, were nearly one-half smaller than the one which (from the length of 4 inches being assigned to the species) I presumed served for Mr. Jenyns' description.

† The difference in the length of jaws is very trivial.

‡ See an excellent figure in the Mag. Zool. and Bot., vol. ii. pl. 13, to which draughtsman and engraver did equal justice.

This individual—4 inches 11 lines in length—is larger than any of this species recorded in the 'Manual of British Vertebrate Animals.' Excepting that the ascending margin of the pre-opercle is not "very oblique," it agrees with the specific characters there attributed to that species, and generally with the detailed description of dimensions. So far as the brief description of colours in the 'Manual' enables a judgement to be formed, there is a similarity between them. The specimen before me (preserved in spirits) presents considerable variety of colours. Two-thirds of the upper portion of the sides and entire body, from origin of anal to base of caudal fin, of a pale but rich brownish-red, with faint indications of several transverse dusky bands; remainder of anterior portion to ventral profile, yellowish-grey. Head variously coloured in stripes, &c., somewhat in the manner of *Labrus variegatus*, Gmel., and others of the *Labridæ*; iris bright red, lips orange; dorsal fin pale, varied with red and dusky tints; of this latter colour from the first to between the third and fourth rays: a black spot, partly on the body and partly on the base of the two last rays terminating this fin: pectorals reddish, with a black band at the outer base of the rays (similar to that in the variety of *Crenilabrus Tinca* called *C. Cornubiensis*): ventrals pale, with reddish markings: anal fin with faint dusky and reddish markings alternating: caudal fin pale dusky, irregularly tinged with a reddish colour.

D. 19 + 11 (last double); A. 3 + 9; P. 14; V. 1 + 5; C. 13 or 14 conspicuous (21 altogether) = Br. 5.

This individual has the ascending line of the pre-opercle less oblique than the smaller specimens; the teeth, instead of the uniformity of arrangement described in *C. multidentatus*, increasing somewhat gradually in size towards the centre, 21 in the lower, and a similar number in the outer row of upper jaw; a dark brown marking appears down the centre of many of them; those of the other individuals are uniformly transparent. Scales three or four fewer in number on the lateral line in the large specimen than in the others, and the tubular projections on those throughout it less developed; in it likewise the concentric *striæ* of the scales are less strongly marked, and the lineated appearance (produced by the *striæ* of each scale being more deeply cut along the centre than elsewhere) less apparent than in the others. The colour already described is very different from that of the smaller specimens. This individual, as well as those described as *C. multidentatus*, was obtained at Youghal.

Coregonus clupeoides, *Nilss.*? Plate XVI. fig. 4.

By the continued kind attention of the Rev. C. Mayne (Vicar-general of Cashel), a second specimen of this fish, taken in the river Shannon near Killaloe, was forwarded to me on the 9th of November last. This individual, being quite perfect, enables me now to supply a figure of the species, and to offer some further remarks upon it. On comparing it in every character with my description of the individual first obtained 'Annals' for Dec., p. 267, which was divested of its scales, and injured in some of the fins, I find very few additional observations to be requisite. Its length is $4\frac{3}{4}$ inches, depth $10\frac{1}{2}$ lines; number of scales on lateral line, and from it to dorsal and ventral profile as described in last, judging in that instance from their impressions merely; the scales rounded at the posterior margin, and smaller than in any other British *Coregonus*. D. 14; P. 16; V. 1 + 11; A. 14? C. $20\frac{12}{12}$ = Br. 9. In the dorsal, the 4th and 5th rays longest, and of about equal length; the few anterior rays of the pectorals about equal, the 1st much the stoutest; 4th and 5th longest in the anal, and about equal; axillary scale of ventrals rather more than one-third their length. *Colour* of specimen (from spirits); body above lateral line and a short way below it pale yellowish-olive when viewed in the shade, but with the light striking on it, of a delicate silvery blue, thence to the belly silvery; dorsal and caudal fins marked over the rays and membrane with black points, imparting to them, when closed, a blackish tinge; pectorals, ventrals, and anal, excepting a very few black points on last, colourless.

It is desirable to institute a comparison of the chief differences between this species and *Cor. Willughbeii*, the only other British fish of the genus having the lower jaw exceeding the upper in length. The *C. clupeoides* differs from this in the mouth being less obliquely cleft, or in having the lower jaw less ascending (when the mouth of *C. Willughbeii* is closed, the point of the lower jaw is so elevated as to be on a line with the upper margin of the pupil of the eye; in the other it is on a line with the centre of the pupil); opercle broader and less rounded off at the base, and with the ascending mar-

gin more oblique in *C. clupeoides**; its scales very much smaller; outline of dorsal fin very different, the membrane in this falling considerably short of the points of the rays, and its outline from the longest ray to the extremity of the fin being somewhat rounded. This comparison was made between two specimens of *C. clupeoides*? from 4 to 5 inches in length, and two of *C. Willughbeii* about 6 inches long.

From the continental species, *Cor. Marœnula*, as described by Bloch, (and which, like the *C. Willughbeii*, agrees with that under consideration in the lower jaw being the longer,) the *C. clupeoides* differs chiefly in having a greater number of rays in the dorsal fin (14 or 15 to 10), in having teeth in the under jaw, (on this difference alone I should not lay any stress, the teeth being so small as to be easily overlooked,) and in the negative character of wanting such an appearance on the lateral line as would come under the description of "garnie de cinquante-huit point noirs:" the scales on the back and greater part of the sides are dotted with very minute black points visible under a lens, and of which those on the lateral line have share, but not so many as the row just above, the number of these points gradually decreasing from the back downwards.

Should this fish eventually prove to be distinct from the *C. clupeoides* of Nilsson, I would suggest that the specific name of *elegans* be applied to it.

Coregonus Pollan. Plate XVI. fig. 5.

In connexion with the figure of *C. Pollan* now given to accompany that of *Cor. clupeoides*, the following remarks are offered. The characters in which the Pollan differed from the two British species known at the time it was announced, were pointed out in the original description. From the two species since recorded, it may in the first place be stated to differ from *C. microcephalus*, the Loch Lomond fish, in having the head longer, the fins less, (and of a lighter colour,) and the scales rather smaller; from the *C. clupeoides* the Pollan

* The difference in this respect between these two species is not greater than we sometimes see in different sexes of the same species of *Salmo*: the *Coregoni* not having been dissected, their sexes are unknown to me.

differs in being much larger, in the jaws being equal*, the scales rather larger and in the form of the dorsal fin. (See accompanying figures.)

Of a female Pollan, 11¾ inches in length, procured from Lough Neagh on the 28th of November last, the entire weight was 9 oz., that of the ova subsequently extracted 2 oz. 3 drachms; of this, which was just ready for exclusion, I had a drachm weighed, and reckoned the number of ova it contained; taking for granted that this would be alike in each drachm throughout the whole, (and from the uniform size of the ova, each a line in diameter, there can be very little difference,) the number of ova altogether would be 6156. This too I should consider about the average produce of the species, as the specimen was of ordinary size, and contained a similar quantity of ova with several others dissected at the same time. Of the stomachs, &c. of twelve Pollans examined on this occasion, the greater number were empty, but two or three contained minute *Entomostraca*, two *Pisidia*, and a *Limnæus pereger*—this last was three lines in length.

Jan. 1, 1839. I received from the Rev. C. Mayne a full-grown specimen of the *Cor. Pollan*, taken near Killaloe, either on the river Shannon or its expansion, Lough Derg.

REFERENCES TO PLATE XVI.

Fig. 1. *Couchia minor*. Fig. 2. *Couchia argenteola*. Fig. 3. *Couchia glauca*. Fig. 4. *Coregonus clupeoides*. Fig. 5. *Coregonus Pollan*.

* This seems to be the best *general* character; I have seen some individuals with the upper rather exceeding the lower jaw, others with the lower slightly projecting beyond the upper, and the difference was not sexual. It is perhaps unnecessary to observe, as it would apply to fishes generally, that other individuals examined vary much in relative proportions from those which served for the original description: the proportion of head to depth of body, it is obvious, must vary in the sexes at particular periods; that of head to entire length I have found to be as 1 to 5, as well as "1 to 3½," and the vertebræ 60. The two following characters were before unnoticed: axillary scale of ventral fins about one-third their length—about 84 scales on the lateral line: this is the number attributed by Dr. Parnell to both of the Loch Lomond *Coregoni*; in a specimen of one of these, *C. microcephalus*, under 10 inches in length, (much less than the size they attain,) with which I have been favoured by its describer, there are but 76? scales on this line. This induced me to examine various sized Pollans, to see whether there might be any difference in this respect, when none appeared in the individuals inspected, which were from 9½ to 13 inches in length.

XLVIII.—*Miscellanea Zoologica.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh. With Plates XXI., XXII., and XXIII.*

VI. The British Aphroditaceæ.

Class Annelides. Order Errantes.

Character. *Head* distinct, antenniferous: *proboscis* in general with four jaws in adjunct pairs: *feet* well developed, not uniform in structure, for some are furnished with a superior cirrus and usually with branchiæ, but without scales; while others, usually squamous, are neither branchial nor cirriferous, and these alternate, for a definite space, along the sides: *branchiæ* sometimes obsolete, always rudimentary and concealed, in the form of crests or tubercles situated on the upper part of the dorsal branch of the foot above the cirrus.

General Observations†.

Of the Annelides furnished with a distinct head, there are some which are flattish and of an oval form; others are slender, cylindraceous and almost filiform. The former constitute the genus *Aphrodita* of Linnæus, the latter his *Nereis*, but these genera embrace animals too dissimilar to be so closely associated. Bruguière, who saw this, began the reform and led the way to a more natural classification: he divided the *Aphroditæ* into two groups, to one of which he preserved the Linnæan name, and he called the other *Amphinome.* For the time this was considered a sufficient subdivision; and Bruguière was followed implicitly, in the first instance by Cuvier and Lamarck; but when Savigny, with richer materials and a deeper knowledge of them, had raised the *Aphroditæ* to the rank of a family with its several subordinate genera, his arrangement and nomenclature were readily adopted by Lamarck, Latreille, and Blainville, and, we may add, are now undisputed.

The *Aphroditaceæ* possess all the characters of the order to which they belong: the head is distinct, they have eyes, antennæ, a fleshy retractile proboscis, and feet to every ring of

* [These Plates will be found in the Supplement published with the present Number.—Edit.]

† Translated, but not literally, from Audouin and M. Edwards.

the body, armed with spines (*aciculi*), bristles (*festucæ*) more or less retractile, and with soft appendages highly developed, but in no instance with the crotchets (*uncinuli*) which belong to less typical orders. In form the *Aphroditaceæ* are in general very unlike the majority of Annelides, for the body in most of them is short, flattened, and more or less inclined to oval, although there are among them some which are slender, elongated, and nearly as cylindrical as the *Nereides*. But there is nothing more remarkable in the external structure of the generality of the *Aphroditaceæ* than the large membranous scales or *elytra*, as Savigny calls them, which lie along the back in a double series and cover it like a coat of mail. These organs are affixed to the base of the superior branch of the feet by means of a short pedicle, and are formed of two cutaneous or epidermoid layers applied the one against the other, but capable of being separated so as to become vesicular, and at certain seasons of the year they appear to be filled with ova. There are, however, in all *Aphroditaceæ* a certain number of feet which carry no scales or elytra, and which alternate with those that are provided with them. The first, the third, and the sixth pairs are almost constantly defective in this respect, and of the feet which follow, the alternate pairs for a more or less considerable extent of the body; but after the twenty-third, the twenty-fifth, or the twenty-seventh segment this regular alternation ceases, for posterior to one or other of these segments the feet may be either all squamous or all entirely naked, or the elytra may continue to appear and disappear alternately, but in an altered series; for it is now not every other but every third foot which bears an elytron. Instances, however, occur in which the binary alternation of squamous and naked feet prevails throughout the whole length of the body, as in the genus *Acöete*; and in the *Palmyre* of Savigny there are no elytra at all.

In some of the *Nereides* (*Phyllodoce*) we find on each side of the body a series of foliaceous lamellæ which resemble the scales of the *Aphroditaceæ*, but these are really very different organs, and never disposed in the alternating manner of the latter, the feet of *Phyllodoce* being all alike. No other Annelide offers any similar structure, so that the presence of feet

garnished with scales which alternate with other feet destitute of that appendage is unquestionably one of the most important characters of the present family and its leading peculiarity.

The elytra are very variable in number, and their shape is not always alike. From their structure it appears probable that they are subservient to respiration, yet we see them often associated with organs to which the name of branchiæ has been given. These are concealed below the elytra, and have the form of small crests or cutaneous nipples; they occupy the upper part of the base of the feet and are always placed within and above the cirrus of the dorsal branch. Sometimes these little appendages are scarcely visible, and they are very rarely to be detected on the squamigerous feet,—that is, on the feet of the second, the fourth, the fifth, the seventh, the ninth segments, and so on. This binary alternation of branchial with abranchial feet is to be observed even in the species which have no elytra (*Palmyre*); but it is not so constant as has hitherto been believed, for in the genus *Acöete* branchial tubercles exist on all the feet, their number being only fewer on the segments which carry the elytra.

In the families allied to *Aphroditaceæ* there are species which present no visible branchiæ, but when these organs exist, their form or their position is essentially different. Thus in the *Nereides* they affect the form of little fleshy tongue-like processes placed at the end of the foot between the superior and inferior cirrus; and although in the *Euniceaceæ* and the *Amphinomenaceæ* they have nearly the same position as in the *Aphroditaceæ*, their configuration is very dissimilar; being in the form of filaments more or less pectinated, of tufts, of arbuscules, or of pinnatifid leaflets.

In the majority of *Aphroditaceæ* the presence of elytra coincides with the absence of *superior cirri*, that is, we find the latter only on such feet as carry branchiæ and do not bear scales. But this character, like the preceding, is liable to exception, for in *Sigalion* there is a superior cirrus to every segment of the body whether elytrous or not, and this fact appears to invalidate the opinion of those who maintain, with Blainville, that the cirri are the analogues of the elytra, or mo-

difications of the same organs, in those Annelides which are not shielded with dorsal scales,—an opinion which from the dissimilarity of their position on the body we might otherwise have hesitated to adopt. The feet of the *Aphroditaceæ* are divided into two branches, each furnished with a spine, with bristles, and with cirri, whose figures vary according to the species. We have spoken above of the superior cirri: the inferior are found on all the feet and offer nothing remarkable for notice, unless on the first segment, where they are very large, and with the superior, constitute *tentacular cirri*, a sort of antennæform filaments placed at each side of the head. But the true antennæ, however similar in appearance, are readily distinguished from them by their insertion on the head itself: of these we generally reckon three*, a middle one and one on each side; and under and exterior to them there are two larger setaceous filaments, which may without impropriety be denominated *palpi*, since they are used to feel the way during the creature's progress. The *eyes* are black points on the upper surface of the head, usually four in number, sometimes only two, and in *Sigalion* their existence is doubtful. From the mouth a *proboscis* is at pleasure evolved, which is armed with four jaws united in pairs, two above and two below, opposed the one to the other by their cutting edge; and this disposition is one of the peculiarities of the family, for in the *Euniceaceæ* there are never less than seven jaws, and in the *Amphinomenaceæ* there are none. Such also is the case with many of the *Nereides*, although several genera in this family have two jaws, and a few even four; but the pairs, unlike those of *Aphroditaceæ*, are perfectly distinct and widely separate.

The British species of this family are few in number, so far as has been ascertained, and are referable to the four following genera.

1. Aphrodita. Body squamous, the scales and superior cirri not coexistent on the same foot, but alternating;

* Savigny and Audouin and Milne Edwards say five; but if we limit, as I think we ought, the term *antennæ* to those filaments which are strictly cranial, there are only three; and what these celebrated naturalists call *external antennæ*, I have, in the following descriptions, called *palpi*, since they originate under the head, and are obviously different in structure, as they appear to be, also, in their functions.

proboscis with rudimentary and cartilaginous jaws or none; antenna one only; palpi two, large; eyes two. (Scales concealed in the British species.)

2. Polynoë. Body squamous, the scales exposed and alternating with the superior cirri; proboscis with corneous jaws; antennæ three, unequal; palpi two, large; eyes four.
3. Pholoë. Body squamous, the scales placed over every alternate foot; cirri none or rudimentary; proboscis with four corneous jaws, the orifice plain; antennæ five unequal, distinct; palpi two, large; eyes two.
4. Sigalion. Body squamous, the scales and superior cirri coexistent on the same feet, the former placed over every alternate foot until the twenty-seventh segment, whence they follow uninterruptedly to the end of the body; proboscis with corneous jaws; antennæ rudimentary; palpi large; eyes none.

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1. Aphrodita*, *Linnæus.*

The *Aphroditæ* are broader and more oviform than the rest of this family, and the segments of the body do not exceed thirty-nine. The head, more or less concealed by the scales or by the bristles, carries two somewhat pedunculated eyes, and a solitary small subulate antenna, but the palpi are comparatively very large. The orifice of the proboscis is encircled with penicillate tentacula and armed in general with thin cartilaginous jaws. The feet are distinctly bifid, and garnished with three bundles of bristles, two of which belong to the dorsal, and the third to the ventral branch; the first pair are small and furnished with long tentacular cirri; but the posterior do not differ observably from the rest. The bristles of the dorsal branch are sometimes very complicated; those of the ventral simple or forked: the cirri are subulate,—the inferior small, the superior long. The scales are large, and, in our native species, concealed by a coarse felt formed by the bristles of the dorsal branch of the feet; there are fifteen pairs

* *Aphrodite*—the Greek name of Venus. In its application to a sea-worm, there may be some allusion to the supposed derivation from ἀφρός, "foam of the sea." Hesiod calls Venus ἀφρογένεια, "foam-sprung."

of them, and the thirteenth are always attached to the feet of the twenty-fifth segment,—the pairs which precede this * alternate on every other ring with the superior cirri, and the pairs which succeed it are placed on every third ring. The branchiæ consist of tubercles sometimes indistinct, often broken on their edges, disposed in transverse rows, and, like the dorsal cirri, they cease to appear and disappear alternately posterior to the twenty-fifth pair of feet: they sometimes differ very little from the protuberances which afford attachment to the scales.

1. *A. aculeata*, scales concealed, blotched with black; hair-like bristles green and golden, the spine-like bristles dark brown. *Sea Mouse.* Plate XXI.

Eruca marina Rondeletii pilis in dorso instar Colli Columbini variegatis, *Sib. Scot. Ill. pars sec. lib.* iii. *p.* 32. Scolopendra marina, *Molyneux in Phil. Trans. abridg.* iv. 133. *and* 368. *pl.* 3. *fig.* 6, 7.—Aph. nitens, *Lin. Faun. Suec.* 367. *no.* 1284.—Aph. aculeata, *Lin. Syst.* 1084. *Pallas Misc. Zool.* 77. *tab.* 7. *fig.* 1—13. *Bast. Opusc. Subs.* ii. 62. *pl.* 6. *fig.* 1—4. *Pen. Brit. Zool.* iv. 86. *tab.* 25. *fig.* 1. *Mull. Zool. Dan. prod.* 218. *no.* 2641. *Turt. Gmel.* iv. 79. *Stew. Elem.* i. 387. *Turt. Brit. Faun.* 136. *Home Comp. Anat. pl.* 39. *fig.* 1, 2. *Blumenb. Elem. Nat. Hist.* 245. *Jameson in Wern. Mem.* i. 557. *Bosc Vers*, i. 181. *Cuv. Règ. Anim.* iii. 206. *Audouin and M. Edwards in Ann. des Sc. Nat.* xxvii. 402. *pl.* 8. *fig* 7. *Edin. Journ. Nat. and Geogr. Sc.* iii. 51. *Roget Bridgew. Treat.* ii. 102. *and* 298.—Aphrodite hérissée, *Brug. Encyclop. Méth.* vi. 85.—Halithea aculeata, *Lam. Anim. s. Vert.* v. 307. *and 2de édit.* v. 542. *Risso l'Europ. Mérid.* iv. 412. *Stark Elem.* ii. 140. *Edin. Journ. Nat. and Geogr. Sc.* iii. 246.

Hab. Common on most parts of the British coast. Found at Leith, *Sir Robert Sibbald.* Coast of Berwickshire, not common.

Desc. *Body* from three to five inches long, oval, narrowest behind, convex dorsally, the back of an earthy colour, roughish with a thick close felt of hair and membrane forming a sort of skin which entirely conceals the scales, the sides clothed with long silky green and golden hairs clustered in fascicles and glistening like burnished metal, with blackish-brown spiniform bristles intermixed: ventral surface flat, often light coloured and dotted, sometimes dark brown, obsoletely ribbed across. *Head* small, entirely concealed, roundish, with two round clear spots or *eyes* on the vertex: *antennæ* minute;

* The fourth and fifth segments, however, are both squamiferous.

palpi large, subulate, flesh-coloured or dusky, jointed at the base, where they approximate, but are separated by a black membranous crest. *Mouth* inferior, with a large retractile edentulous proboscis; the orifice encircled with a short even thick-set fringe of compound penicillate filaments divided into two sets by a fissure on each side: each filament has a short stalk with a tuft of numerous forked papillæ on its summit; exterior to the orifice of the proboscis there are four fleshy tubercles placed at the angles. *Scales* fifteen pairs, roundish, smooth, thin and vesicular, blotched with black stains and specks, the first pair small, laid over the head, the anal pair oval: *Feet*, thirty-nine pairs*, largest and most developed near the middle of the belly, very small and approximate at the anus, biramous, the branches wide asunder; the superior carries, in a sort of crest-like fashion, the long flexible brilliant coloured bristles which form the silky fringe on each side of the body, and above them some still more delicate hairs, which by their intertexture constitute the membrane covering the scales, and with which the strong spiniform bristles are intermixed, placed in a sort of cross series: the inferior branch is armed with three rows of stout short bristles, in the upper row only two or three which are longer and stouter than those of the next row in which there are five or six, and which again are stouter but less numerous than those in the lowest row: *spine* golden yellow, conical, smooth: *superior cirrus* long, subulate, bulged at the base; the *inferior* short and conical: *anus* large, with a dorsal aspect, encircled with several tentacular cirri.

The very vivid iridescent hues which the hairs of this remarkable worm reflect, render it an object of wonder and surprise to the most incurious: they are not equaled by the colours of the most gaudy butterfly, and rival the splendour of the diamond beetle†. It creeps at a slow pace, and in its progress a current of water is projected at short intervals,

* Pallas says, "constanter 40—41. Horum 2 primi minuti, compressi submutici, ex oris quasi palato antrorsum producti, villo barbati, at setis et cirrho destituti."

† "The *Aphrodita aculeata* reflecting the sun-beams from the depths of the sea, exhibits as vivid colours as the peacock itself spreading its jewelled train." *Linnæus* in Smith's 'Tracts relating to Nat. History,' p. 32.

and with considerable force, from the anus. When placed in fresh water the creature gives immediate signs of its painful situation and soon dies, first ejecting a white milky fluid, and in the agony of death a large quantity of a blackish-green turbid liquor. The size and strength of the proboscis is remarkable, and not less so the structure of the filaments which garnish the orifice. The œsophagus is short; the stomach and intestine seem to be alike and inseparable—together they form a straight intestine, sometimes with a wide dilatation in some part of its canal, with a velvety inner surface folded into longitudinal plaits near the termination at the anus. Although apparently planted round with offensive arms of considerable strength, the worm is said to be a favourite prey of the codfish, in whose stomach specimens, in a perfect condition, may be sometimes obtained. Baster tells us that the sexes are distinct. "Hæ *Aphroditæ* eodem, quo pisces, modo generare videntur; et si quis earum quasdam Junio mense dissecuerit, mares lactibus, fœmellas multis ovis instructas videbit."

Plate XXI. Fig. 1. *Aph. aculeata* of the natural size. 2. The head uncovered. 3. The head detached and somewhat magnified. 4. Under view of the anterior part of the body. 5. The orifice of the proboscis. 6. The proboscis laid open by a longitudinal section. 7. A few of the penicillate filaments magnified. 8 and 9. Two views of the feet. 10. Various bristles. 11. The spine.

2. Polynoë*, *Savigny.*

Polynoë is readily distinguished from *Aphrodita* by the number of the antennæ, by the more powerful armature of the mouth, and by the part of the body at which the scales cease to alternate with the cirri. The form of the body, and the number of its component rings, varies much; all our known native species are linear or elliptic-oblong, but there are foreign species of a linear and worm-like figure. The back is either entirely covered with the scales or naked in the middle, the scales in the latter being less developed and not meeting on the mesial line.

The head of the *Polynoës* is large and corneous, with four eyes on its upper convex surface arranged in pairs: the antennæ are rarely two only, three being the usual number, of which the central one is longer than the lateral, and it again

* Polynoë—one of the Nereids.

yields in strength and longitude to the palpi. The mouth has a projectile proboscis with a circle of little tentacula round its orifice and four large horny jaws curved at their points. The scales or elytra are always exposed, and are very variable in number, but the first twelve pairs regularly alternate with the superior cirri on the twenty-three first segments, and if more elytra exist they alternate in a different series, or on every third segment: they are lamellar or sometimes vesicular, and either smooth or covered with little granulations. The branchiæ, which are simple and obscure, exist only on the non-elytrous feet, and follow consequently the same alternating order. The feet are bifid, but the superior branch is small and almost confluent with the inferior, which is greatly developed. The superior cirri are long, the inferior short and conical: the bristles of the superior branch short and almost always slenderer than those of the inferior, subulate and smooth at the point, or like the inferior bristles, somewhat thickened and serrulate along the edge. The spines present no peculiarity. The first pair of feet are destitute of bristles, but are terminated by two long tentacular cirri, which advance on each side of the head and resemble antennæ; while on the last segment we find filiform appendages formed by a nutation of the superior cirri, and constituting in general terminal styles.

* *Scales immovably fixed.*

1. *P. squamata,* scales twelve pairs, ovate, imbricate, granulous, ciliated on the external margin. Plate XXII. fig. 1.

Aphrodita squamata, *Lin. Syst.* 1084. *Pallas Misc. Zool.* 91. *tab.* 7. *fig.* 14. *a—d.* *Bast. Opusc. Subs.* ii. 66. *pl.* 6. *fig.* 5. *Pen. Brit. Zool.* iv. *tab.* 25. *fig.* 2. *Turt. Gmel.* iv. 80. *Stew. Elem.* i. 387. *Turt. Brit. Faun.* 136.—Aph. scabra, *Penn. Brit. Zool.* iv. 88. *Turt. Gmel.* iv. 80. *Stew. Elem.* i. 387. *Turt. Brit. Faun.* 136. *Jameson in Wern. Mem.* i. 557.—Aph. pedunculata, *Pen. Brit. Zool.* iv. 87. *tab.* 26. *fig.* 2.—Aph. longirostra, *Brug. Encyclop. Méth.* vi. 86. *Bosc Vers,* i. 182.—Aph. clava? *Montagu in Lin. Trans.* ix. 108. *tab.* 7. *fig.* 3.—Aph. punctata, *Bosc Vers,* i. 182. *Jameson in Wern. Mem.* i. 558.—Polynoë squamata, *Lam. Anim. s. Vert.* v. 309. *Stark Elem.* ii. 139. *Audouin and Edwards in Ann. des Sc. Nat.* xxvii. 416. *pl.* vii. *fig.* 10—16.—Polynoë scabra, *Johnston in Zool. Journ.* iii. 331.

Hab. In deep water, frequent on the coast. Brighthelmstone and Anglesea, *Pennant.* Leith shore, and Orkney and Shetland Islands, *Prof. Jameson.* Berwick Bay, *G. T.*

Desc. *Body* generally about one, rarely two inches long, depressed, linear-oblong, of equal breadth at both ends, of a uniform cinereous colour, rough: *scales* twelve on each side, rather large, ovate, imbricate, rough, with brown granulations, ciliated on the external margin, the overlapped smoother than the exposed portion, for the granules on the former are more minute than on the latter; the anterior scales are smaller and rounder than the others and completely cover the head, which is a subtriangular pink or purplish corneous plate, furnished with four small *eyes*: *antennæ* three, the central one largest, bulbous near the point: *palpi* two, longer than the antennæ, swollen near the apex; the *tentacular cirri* similar to the superior *cirri* of the feet; these are white with a blackish ring at the bulb where the acumination commences, retractile, originating from above the dorsal branch of every alternate foot and under the scales; the three last pairs of feet each with a cirrus: *feet* twenty-five pairs, obtuse, subbifid, the dorsal branch shorter and less than the ventral, each terminated with a brush of stiff brown bristles, and under the ventral branch there is a small setaceous cirrus and also a fleshy spine at its junction with the belly: *bristles* when removed golden yellow, those of the dorsal branch slenderest, gently curved, acutely pointed, and serrulate for about half their length; those of the ventral branch stouter, slightly bent near the top, and serrulated with a double series of teeth on the outer side of the bend; each tuft of bristles inclosing a dark brown straight *spine*, the inferior stouter than the upper one: ventral surface straw-colour, prismatic, marked with the viscera, and sometimes spotted with black near the base of the feet.

This species differs remarkably from those which follow in the tenacity with which the dorsal scales adhere to their tubercles of attachment, from which they cannot be separated except by the dissecting knife; and this fact determines the species to be almost certainly the *Aphrodita squamata* of Linnæus. His *Aph. scabra* must ever remain in uncertainty, for no *Polynoë* has twenty scales, as he states them to be in that species. The *Aph. scabra* of Otho Fabricius is said to have fifteen pairs of scales; and overlooking this important fact, I, on a former occasion, much too confidently identified

it with the present, but the description is otherwise so very applicable, that, I must acknowledge, a suspicion of their being the same species still remains. That this is the *Aph. scabra* of British authors scarcely admits of a doubt. It is much less certain whether it is the *Aphrodita clava* of Montagu; but as he has himself suggested their possible identity, and as his description and figure are both of them too imperfect to characterize a species, we see no harm in reducing his to a conjectural synonym. In the description the scales are stated to be "twelve or thirteen pairs," but the figure shows thirteen scales on one side and fourteen on the other, with a naked space between the rows. Audouin and M. Edwards conjecture that *Aph. clava* may be the same as their *P. lævis* characterized by having fourteen pairs of perfectly smooth scales.

Plate XXII. Fig. 1. *Polynoë squamata*, nat. size. 1 *a*. The jaws, slightly enlarged. 1 *b*. A scale magnified. 1 *c*. A spine magnified. 1 *d*. A bristle from the ventral branch of the foot magnified.

** *Scales deciduous.*

2. *P. cirrata*, scales 15 pairs, ovate or kidney-shaped, imbricate; bristles of the dorsal branch of the feet shorter than those of the ventral branch. Plate XXII. fig. 2.

Aphrodita cirrata, *Mull. Zool. Dan. Prod.* 218. *no.* 2644. *Fabr. Faun. Grœnl.* 290. *tab. fig.* 7. *Bosc Vers*, i. 183.—Aph. squamata, *Penn. Brit. Zool.* iv. 87. (*excl. fig.*)—Aph. imbricata, *Penn. Brit. Zool.* iv. 88. *Stew. Elem.* i. 388. *Jameson in Wern. Mem.* i. 558.—Aph. violacea, *Mull. Zool. Dan. prod.* 218. *no.* 2645. *Turt. Gmel.* iv. 81.—Aph. plana, *Stew. Elem.* i. 388.—Polynoë imbricata, *Johnston in Zool. Journ.* iii. 332.—P. cirrata, *Audouin & Edw. in Ann. des Sc. Nat.* xxvii. 422.

Var. *With a dark red fascia along the back.*—Aphrodita lepidota, *Pallas Misc. Zool.* 94. tab. 7. *fig.* 15 *a*, *b. and tab.* 8. *fig.* 1, 2. *Mull. Zool. Dan. prod.* 218. *no.* 2643. *Turt. Gmel.* iv. 81. (*exclus. syn.*) *Stew. Elem.* i. 388. *Bosc Vers*, i. 183.—Polynoë lepidota, *Johnston in Zool. Journ.* iii. 333.

Hab. Under stones between tide marks, common. "Taken off Anglesey," *Pennant.* Leith shore, and Orkney and Shetland Islands, *Jameson.* Berwick Bay, common, *G. J.*

Desc. *Body* elliptic-oblong, somewhat narrowest posteriorly, about $1\frac{1}{2}$ inch long, 3 lines broad, variously coloured, of a uniform olive, brown, or mottled, often marked with a series of pale spots along the sides, one to every scale, sometimes with a red band down the back, and sometimes pied

with lighter and dark shades; belly perlaceous, with a red central line from a blood-vessel appearing through the skin: *head* mostly concealed by the anterior scales, cordate with an impressed line in the middle, pink-coloured or reddish, with four *eyes* placed wide asunder: *antennæ* three, the medial largest, all bi-articulate, swollen near the apex, which is acutely pointed: *palpi* two, setaceous with a suddenly acuminated point, paler coloured, stouter and twice as long as the antennæ, somewhat annular: *tentacular cirri* two pairs, similar to the medial antenna, the bulb ringed with black, the acute points pale: *scales* fifteen pairs, imbricate, ovate or kidney-shaped, the anterior nearly circular, variously coloured and dotted, convex towards the centre, smooth to the naked eye, but really roughish with scattered short spines or processes visible only in certain lights or near the margin; they are attached to the 2nd, 5th, 6th, 7th, 9th, 11th, 13th, 15th, 17th, 19th, 21st, 23rd, 26th, 29th, and 32nd segments by mammillary tubercles, considerably larger than the alternating branchial ones, and when removed the back appears spotted over the base of the feet, the spots becoming quite distinct and regular near the tail, which is terminated by two *styles*: superior *cirri* eighteen, bulbous near the apex, which is pointed, with a dark ring at the bulb and blackish about the base: *feet* thirty-six pairs, each with a small inferior cirrus and garnished with numerous straw-yellow bristles, those of the dorsal branch shorter than those of the ventral, all slightly bent near the apex, which is minutely serrulate and acute: *spines* simply conical.

The animal moves quickly by means of its feet in a somewhat undulating manner, the medial antenna being held erect and reverted, the palpi stretched forwards and inclined to the ground, which it examines by their aid. When thrown into fresh-water it dies almost instantly, and the scales drop off; and even during life these organs are removed with so slight a friction that it is not easy to take up a specimen without depriving it of one or more of them.

Of his *Aphrodita Lepidota* Pallas says, "Certe in mari inter Angliam et Belgium satis copiose occurrit hæc species, et ex fascia plerumque longitudinali nigra facile adgnoscitur." A *Polynoë* marked in this fashion is common on our shore, which

answers well also to Pallas's figure, but our worm is certainly nothing more than a variety of the *P. cirrhosa.* Pallas, however, says that his *Lepidota* has only fourteen pairs of scales, and were this point found to be correct, it would certainly determine it to be a distinct species. We leave it to future inquiry.

Polynoë cirrata, it seems necessary to remark, is not identical with the *Aphrodita cirrhosa* of Pallas, for he expressly says that the bristles of the dorsal branch of the foot are *longer* than those of the inferior branch. Misc. Zool., p. 96. The species are otherwise very nearly allied.

Plate XXII. Fig. 2. *Polynoë cirrata,* nat. size. 2 *a.* The head; ′ the antennæ; ″ the palpi; ‴ the tentacular cirri. 2 *c.* A scale. 2 *d.* The proboscis laid open. 2 *e.* A foot, with a tentacular cirrus. 2 *f.* A foot, without the tentacular cirrus.

3. *P. impar,* scales thirteen pairs, imbricate, rough; tentacular cirri clothed with short spinous filaments. Plate XXII. fig. 3—9.

Hab. Under stones between tide marks. In Berwick Bay with the preceding, but rare.

Desc. *Body* linear-oblong, narrowing insensibly from the head to the tail, depressed, slightly convex on the back, of a freckled or mottled brownish colour. *Head* concealed by the anterior scales, square, sinuated in front, pale. *Eyes* very distinct, the posterior pair most approximated. *Proboscis* with four rather large corneous hooked maxillæ, the orifice encircled with a single series of simple filaments. *Antennæ* five, the central one setaceous, elongate, of a pink or flesh-colour; the middle pair very small; the outer pair as long and rather thicker than the odd one, but pale-coloured, all of them appearing roughish when highly magnified. *Scales* thirteen pairs, imbricate, covering the back entirely, some of them roundish, others subquadrangular, and others kidney-shaped, rough with miliary granules excepting on the covered side, the external margin fringed with short cilia. *Feet* uniramous, armed with two fascicles of very stout bristles, the superior with the most numerous and longest bristles. *Bristles* all of them simple, the longest formed like a lance, the shorter curved like a sword towards their points, which are concave and serrulate

along each margin: a single conical acuminate *spine* to each brush of bristles. *Tentacular cirri* alternating as usual, covered with short fleshy obtuse spines, the point of the cirrus suddenly acuminate, naked, and frequently spathulate at the apex. *Tail* with two of the filaments disproportionally elongate.

PLATE XXII. Fig. 3. *Polynoë impar*, nat. size. 4. Head uncovered and magnified. 5, 5*, 6. Scales magnified. 7, 8. Two views of two feet, magnified; *b.* the tentacular cirrus. 9. Three bristles.

4. *P. viridis*, scales eighteen pairs.

Aphrodita viridis, *Montagu in Lin. Trans.* xi. 18. *tab.* iv. *fig.* 1.

Hab. South coast of Devonshire, *Montagu.*

DESC. *Body* long, greenish, with about thirty-six fasciculi on each side, and covered with *eighteen* pairs of squamæ, which appear a little speckled by reason of their being somewhat rugose: the *fascicles* are much divaricated, and between each scale is a fleshy filiform appendage terminated by an extremely fine fibre: *tentacula* four, setaceous: *eyes* four, small and black. Length three-fourths of an inch. Rare.

"Possibly this is the *cirrosa* of Pallas, as it nearly accords in the number of feet; and probably some of the scales of his were lost, as it is usual for them to be in number about half those of the feet." *Montagu.*

Obs. In the figure there are only fourteen scales on each side.

The two worms described below are so obscure that we can say of them no more than that they appear to be referable to this genus:

Aphrodita annulata, "oblong, fusiform, annulated, smooth, excepting a row of minute spines (one on each ring) running along the back; feet small; size two inches and a quarter; of a pale yellow colour." *Pen. Brit. Zool.* iv. 87. *tab.* 26. *fig.* 3. *Stew. Elem.* i. 388. *Turt. Brit. Faun.* 136.

Aphrodita minuta, "with small scales; slender; not an inch long. Taken off Anglesey." *Pen. Brit. Zool.* iv. 87. *tab.* 26. *fig.* 4.—Aph. lepidota, *Turt. Brit. Faun.* 136.

3. PHOLOË*, *Johnston.*

1. *Ph. inornata.* Plate XXIII. fig. 1—5.

* A Nereid:

"As Pholoë, most that rules the monsters of the main."
Drayton, Polyolbion, Song xx.

Palmyra ocellata, *Johnston in Zool. Journ.* iii. 329.

Hab. Amongst Confervæ between tide-marks. Berwick Bay, rare.

Desc. *Worm* half an inch in length, scarcely a line in breadth, almost linear but a little narrowed behind, rounded at the extremities, flattened, of a yellowish-brown colour, dusky along the sides, and marked there with a series of paler round spots indicating the point of fixture of the scales: *head* small and obscurely defined, corneous: *eyes* two, very distinct, black, placed backwards: *palpi*, long, conical, smooth, jointed at the base, pointing forwards: *antennæ* five, the outer pair larger than the three intermediate, and fringed on the inner sides with a few fleshy spines; the odd antenna superior and small: *mouth* inferior, provided with a firm cartilaginous *proboscis* armed with two pairs of jaws similar to those of the *Sigalion*, but the orifice appears to be plain: *body* with about forty pairs of *feet*, which seem to be all alike and destitute of tentacular cirri, but we find two minute fleshy papillæ near their bases on both the dorsal and ventral sides: the feet are not distinctly divided into two branches, but there is a fleshy fold behind the apex, and within which the apex can be retracted: from this fold there originate two bundles of *simple bristles*, one dorsal and the other ventral, the bristles short; the apex itself is armed with a bundle of *compound bristles*, jointed near the point and fashioned like those of a *Polynoë*: to each brush of bristles there is a conical *spine* placed in the centre of the brush. The *back* of the worm is partially covered with a row of *scales* placed over the bases of the feet down each side, but the middle of the back is naked: there are fourteen pairs of scales, some of them round, others oval, all spinous on the outer edge, smooth, raised in the centre: *belly* smooth, flesh-coloured: posterior extremity without styles.

Plate XXIII. Fig. 1. *Pholoë inornata*, of the natural size. 2. The anterior portion of the body, magnified. 3. The proboscis laid open, magnified. 4. Two of the dorsal scales. 5. The foot.

4. Sigalion*, *Audouin and M. Edwards.*

This genus is distinguished from every known Annelide by

* Perhaps formed from σιγαλόεις—curiously or anomalously made—but *Sigalion* is a name of Harpocrates, the companion of Esculapius and Hygeia, by whom physicians were obliged to swear that they would observe a religious silence in their profession. See Sprengel, Hist. de la Médecine, i. 136.

the co-existence of superior cirri and scales on the same foot. The body is elongate, depressed, almost linear, and formed of numerous segments. The disposition of the cephalic extremity is singular; for the head, in place of being exactly terminal, is overtopped by the first pair of feet, which are lodged underneath it and more or less approximated to the mesial line. In our native species there are three cranial tentacula, but in a foreign species the odd one is wanting, and the lateral are always small and lie upon the peduncles of the first feet. The palpi on the contrary are long, and are placed outside and under these feet, of which the two terminal cirri are pointed forwards and may be mistaken for true antennæ. There appear to be no eyes. The mouth is inferior, and is the outlet to a proboscis similar to that of *Polynoë*, but armed with less powerful jaws. At the superior base of every foot there is a rounded protuberance which gives origin to a cirrus, and which also carries a scale on such feet as have this appendage, a fact inconsistent with the theory which maintains that the scales are mere modifications of the cirri. On the anterior part of the body the scales appear and disappear on every other segment, but subsequent to the twenty-sixth pair of feet there is one to each segment, and two or more to the two last segments, so that their number is always considerable. The feet are distinctly divided into two branches; the superior branch terminated with a single brush of bristles, the inferior sometimes with one and sometimes with two, but the bristles are shorter. The inferior cirrus is very obvious and is inserted far from the extremity of the foot. The appendages of the anal ring form two tentacular styles. As to the branchiæ, there is no trace of them at the base of the feet, and when Audouin and Edwards inform us that they seem to be replaced by the fringes which garnish the external margin of the elytra, they surely forget that these fringes are not more developed than they are in *Polynoë*, and their structure is very unlike that of a respiratory organ.

1. *S. Boa*, scales entirely covering the back, reniform; antennæ three, the odd or medial one twice as long as the lateral; palpi elongate. Plate XXIII. fig. 6.

Sigalion Boa, *Johnston in Mag. Nat. Hist.* vi. 322. *fig.* 42.

Hab. Under stones near low water mark; not uncommon in Berwick Bay.

Desc. Body seven or eight inches long, linear, flattened, slightly tapered towards the tail, the anterior extremity obtuse and somewhat rounded, the beak covered with two rows of scales of an ash or sometimes reddish-brown colour, but as some of the scales are often paler or whitish, the body then appears piebald: head small, convex, corneous, concealed by the rounded anterior pair of scales, terminated in front with three short setaceous two-jointed antennæ, the central one larger and longer than the others: eyes none, but at the base of the least antennæ there are two depressed punctures very like eyes: palpi two, setaceous, half an inch long, arising above and at the sides of the mouth: mouth inferior, furnished with a retractile cartilaginous proboscis about an inch long, armed with two pairs of sharp horny teeth plain on the margin, the aperture encircled with a double series of papillary tentacula, the outer series much longer than the inner, which however is the most numerous: scales imbricate, kidney-shaped, convex, roughish, the concealed portion pale, the outer and larger margin fringed with very delicate hairs and some short anomalous processes; there are about 140 scales on each side, each affixed to a fleshy tubercle, from the end of which a tentacular filament is extended, equal to the feet in number, and placed exactly above them: feet extremely numerous, obtuse, bifid, the superior branch papillary with a brush of long unequal bristles curved upwards, the inferior branch truncate, somewhat sinuate, with two brushes of short bristles, and underneath with a setaceous cirrus equal to the superior: bristles of superior branch, setaceous, unjointed, serrulate on their upper half, with a spine in the centre of the brush; the bristles of the inferior branch are most of them stout, enlarged near the top, and terminated with a sort of claw toothed on the inner side; some of these are marked with a few circular striæ below the joint, and there is a spine in their centre; there are other more slender bristles which are two-jointed, the apical joint longish, acute, and smooth: ventral surface pale, perlaceous, marked down the middle with a red vessel: tail terminated with two short filaments. When killed in fresh-water the scales readily drop off, and the relaxed body of a large specimen will then measure ten or twelve inches. Young

individuals are generally of a light grey colour. When placed in a basin of sea-water it appears sluggish, but it burrows in loose sand with much rapidity, being enabled to do so by the play of its innumerable feet.

Plate XXIII. Fig. 6. The proboscis of *Sigalion Boa* removed and laid open. Fig. 7. The head and anterior segments seen from above. Fig. 8. The head on the ventral aspect to show the mouth and origin of the palpi. Fig. 9. A scale from near the middle of the body. Fig. 10. A side view of a foot. Fig. 11. A bristle from the dorsal ramus of the foot, unjointed but finely serrulated on one side. Fig. 12. Another bristle from the same ramus, slenderer and quite smooth. Fig. 13. A bristle from the indentation of the foot between the dorsal and ventral rami. Fig. 14. A bristle of the ventral ramus. Fig. 15. Another bristle of the same, situated under the former and consequently next the ground.

XLIX.—*Enumeration of Plants collected by* Mr. Schomburgk, *British Guiana.* By George Bentham, Esq., F.L.S.

[Continued from p. 111.]

COMPOSITÆ.

37. *Leria nutans*, DC. Prod. vii. p. 42.—British Guiana. Schomburgk, n. 689.

Since the publication of my former article on Mr. Schomburgk's plants another package has been received from him, in which the *Wulffia platyglossa* has been again sent under the number 705, and the following additional species :

38. *Porophyllum latifolium*, n. sp., herbaceum, erectum, foliis longe petiolatis lato-ovatis obtusis grosse sinuatis ad sinus pellucido-glandulosis, involucri squamis mucrone calloso-acuminatis.—Dry Savannahs on the Upper Rupunoony. Schomburgk.

Differs from *P. ellipticum* in the upper leaves being scarcely longer than they are broad, and rounded, not narrowed at the base.

39. *Baccharis erioptera*, n. sp., caule subramoso pluri-alato, foliis ovatis alisque supra arachnoideo- subtus dense albo-tomentosis, spicis densis subinterruptis, capitulis sessilibus, involucris ☿ tomentosis squamis subulato-acuminatis.—Dry Savannahs on the Upper Rupunoony. Schomburgk, n. 709.

GENTIANEÆ.

In the arrangement of this order I have followed the excellent monograph lately published by Dr. Grisebach of Berlin, under the title of 'Genera et Species Gentianearum.'

40. *Schultesia stenophylla.* Mart. Nov. Gen. et Sp. 2, p. 106, t. 182. Griseb. Gent. 126.—Exacum Guianense. *Aubl. Pl. Guian.* i. p. 68. t. 26. f. 1. Moist Savannahs, British Guiana. Schomburgk.—French Guiana. Leprieur and Herb. Par. n. 143.

It is also Gardner's n. 1065 from Pernambuco, and Blanchet's n. 2722 from the Serra Jacobina.

41. *Schultesia brachyptera*, Cham. Griseb. Gent. p. 128.—British Guiana. Schomburgk.—French Guiana. Leprieur and Herb. Par. n. 141.

42. *Coutoubea spicata*. Aubl. Pl. Guian. i. p. 72. t. 27. Griseb. Gent. p. 130.—Banks of the Rupunoony. Schomburgk, n. 152.

43. *Coutoubea reflexa*, sp. n., caule herbaceo annuo stricto ramoso teretiusculo, foliis lanceolatis acutis basi angustatis margine revolutis, spicis axillaribus terminalibusque, floribus oppositis distantibus, corollæ laciniis reflexis.—Moist Savannahs, British Guiana. Schomburgk.

Not so tall as *C. spicata*, leaves shorter and thicker, flowers larger, sepals broader, style shorter, with larger stigmates, anthers much larger.

44. *Schuebleria tenella*. Mart. Nov. Gen. ii. p. 117. Griseb. Gent. p. 162.—Exacum tenuifolium. *Aubl. Pl. Guian.* i. p. 70. t. 26. f. 2.—Schuebleriat enuifolia. *G. Don. Gard. Dict.* 4.—French Guiana. Leprieur and Herb. Par. n. 176.

45. *Schuebleria coarctata*, sp. n., caule filiformi subsimplici, foliis oppositis linearibus, cyma coarctata, corollæ flavescentis calycem dimidio superantis lobis oblique ovatis acutis tubum subæquantibus, stigmate lineari-clavato.—Arid Savannahs on the Rupunoony. Schomburgk, n. 167.

Very near *S. tenella*, but besides the dense cyme and linear stigmate, the sepals are longer, spreading at the maturity of the capsule, and the flowers are occasionally, but very seldom, tetramerous.

Grisebach had unfortunately only seen a specimen past flower of this plant, which he referred to the *Exacum tenuifolium* of Aublet, and trusting to that author's figure and description, established it as a distinct genus, under the name of *Apophragma*, and characterized chiefly by the supposed bilamellate stigma and appendiculate stamina. But to me it appears evident, that although Aublet's principal figure exactly represents the *Schuebleria tenella*, yet that the details are taken from a *Coutoubea* or a *Schultesia*; at any rate none of the Guiana specimens before me offer anything like what he describes and figures. If the above supposition be correct, Aublet's species and Grisebach's *Apophragma* must be suppressed altogether.

46. *Lisianthus uliginosus β guianensis*. Griseb. Gent. p. 182.—Moist Savannahs, British Guiana. Schomburgk, n. 265. "Flowers light blue." (Schomb.)

47. *Lisianthus chelonioides*, Linn. Griseb. Gent. p. 184.—British Guiana. Schomburgk.

48. *Irlbachia cœrulescens*. Griseb. Gent. p. 195.—Lisianthus cœrulescens. *Aubl. Pl. Guian.* i. p. 207. t. 82. *Mart. Nov. Gen. et Sp.* 2. p. 99. t. 178. f. 2.—Moist Savannahs, British Guiana. Schomburgk, n. 164. —French Guiana. Leprieur and Herb. Par. n. 140.

SCROPHULARIACEÆ.

49. *Bacopa aquatica.* Aubl. Pl. Guian. i. p. 128. t. 49. Herpestis stellarioides β Cayennensis. *Benth. in Hook. Comp. Bot. Mag.* ii. p. 57. —Swampy situations on the Essequibo and Rupunoony. Schomburgk, n. 532.—French Guiana. Leprieur and Herb. Par. n. 178.

This remarkable genus is so exactly a *Herpestis* in everything but the stamina, that in my enumeration of the genus *Herpestis*, having a meagre Cayenne specimen before me, without corolla or stamina, there did not appear to me to be any decided character to distinguish it even as a species from the *H. stellarioides*; and I had excluded *Bacopa* from the order on account of the regular pentandrous flowers. Having now, however, had opportunities of examining good flowers, I am convinced that it is one of those plants which show that the absence or sterility of the fifth stamen is not an essential character of the *Scrophulariaceæ*, and *Bacopa* must take its place next to *Herpestis* in my tribe of *Gratioleæ*. The following are the generic and specific characters I should propose :—

Calyx 5-partitus sepalis imbricativis, postico maximo foliaceo, 2 anticis pariter foliaceis at minoribus, 2 lateralibus interioribus lineari-carinatis. Corollas ubrotata v. campanulata, æqualiter 5-fida, æstivatione imbricativa. Stamina 5, æqualia, laciniis corollinis alternantia. Antheræ lineari-sagittatæ, biloculares, loculis subparallelis, rima longitudinali dehiscentibus. Ovarium biloculare. Stylus simplex. Stigma bilamellatum. Capsula membranacea, vix dehiscens, bilocularis, dissepimento membranaceo fere per totam superficiem placentifero. Semina numerosissima, horizontalia, oblongo-ovoidea, acuminata, testa reticulata, albumine copioso, embryone crassiusculo recto, radicula ad hilum spectante.—Herbæ Americæ tropicæ, paludosæ, glabræ, *Herpestidibus* pluribus sectionis *Bramiæ* similes. Folia opposita. Pedunculi axillares, solitarii vel fasciculati, uniflori, bracteis 2 setaceis aucti. Corollæ cœrulescentes v. albæ.

1. *B. aquatica* (Aubl.), foliis lanceolatis, bracteis a calyce remotis, sepalis exterioribus in pedunculum subdecurrentibus, corollæ calycem subdimidio superantis laciniis ovali-oblongis.

2. *B. grandiflora* (Mart.), foliis lanceolatis, bracteis calyci approximatis, sepalo postico basi cordato, corollæ calycem duplo superantis laciniis late obovatis.—In inundatis et aquis stagnantibus inter Alegre et Olho d'Agoa, in provincia Brasiliæ Piauhi inferiori legit cl. Martius.

50. *Herpestis sessiliflora.* Benth. in Hook. Comp. Bot. Mag. ii. p. 58. —French Guiana. Leprieur and Herb. Par. n. 180.

51. *Beyrichia ocimoides.* Cham. et Schlecht. Linnæa, iii. p. 21.—Sands of the Essequibo and Rupunoony. Schomburgk, n. 528.

52. *Conobea aquatica.* Aubl. Pl. Guian. ii. p. 639. t. 258.—Demerara. C. S. Parker.—French Guiana. Leprieur and Herb. Par. n. 179.

53. *Vandellia crustacea.* Benth. Scroph. Ind. p. 35.—French Guiana. Herb. Par. n. 177.

54. *Vandellia diffusa.* Linn. Mant. p. 89.—Borders of the Essequibo and Rupunoony. Schomburgk, n. 516. "Flowers white with a blush of rose." (Schomb.)

This appears to be a common plant on the eastern coasts of tropical America. It is Sieber's n. 305 from Martinica, and his n. 170 from Trinidad, and Gardner's n. 1097 from Pernambuco, and is also in Salzmann's and other Bahia collections.

55. *Torenia parviflora,* Hamilt. Benth. Scroph. Ind. p. 39.—Rich soil along the large rivers in British Guiana. Schomburgk, n. 335. It is also Gardner's n. 213 from Rio Janeiro.

The three last species belong to East Indian genera, and two at least, *Vandellia crustacea* and *Torenia parviflora,* are very common East Indian species, which have evidently been introduced from thence to the American coasts. This may also be the case with the *Vandellia diffusa,* although I have not myself yet seen any specimens from the old world.

56. *Buchnera palustris,* Spreng. Benth. in Hook. Comp. Bot. Mag. i. p. 365.—Piripea palustris. *Aubl. Pl. Guian.* ii. p. 628. t. 253. Moist Savannahs, British Guiana. Schomburgk, n. 419.—French Guiana. Leprieur and Herb. Par. n. 184.

57. *Buchnera lavandulacea.* Cham. et Schlecht. Linnæa, ii. p. 589.—Dry Savannahs, amongst rocks, British Guiana. Schomburgk, n. 99.

This is also Cuming's n. 1100 from Panama. It should probably be referred either to *B. longifolia* or to *B. lithospermifolia* of Humboldt and Kunth, which may indeed be varieties of one species.

58. *Scoparia dulcis.* Linn. Sp. p. 168.—British Guiana. Schomburgk, n. 622.

It is also Gardner's n. 90, from Rio Janeiro; Cuming's n. 1000, from Lima; and occurs in most collections from tropical America and the West Indies.

59. *Gerardia hispidula.* Mart. Nov. Gen. et Sp. iii. p. 13. t. 207.—Benth. in Hook. Comp. Bot. Mag. i. p. 207.—Sandy swamps, British Guiana. Schomburgk, n. 674.—French Guiana. Leprieur, Herb. Par. n. 183.

"The whole plant assumes a purplish tint, the calyx is deep purple, the corolla whitish, with a purple tint." (Schomb.) The bracteæ rub easily off after the flowering is over, but may almost always be observed on the young pedicels.

60. *Glossostyles aspera.* Cham. et Schl. Linnæa, iii. p. 22. Benth. in Hook. Comp. Bot. Mag. i. p. 212.—French Guiana. Leprieur, Herb. Par. n. 182.

LABIATÆ.

61. *Hyptis recurvata,* Poit. Benth. Lab. Gen. et Sp. p. 81.—Sands of the Essequibo, British Guiana. Schomburgk, n. 605.

62. *Hyptis paludosa*, St. Hil. Benth. l. c. p. 82.—Moist Savannahs, British Guiana. Schomburgk, n. 686.

63. *Hyptis lantanæfolia*, Poit. Benth. l. c. p. 101.—British Guiana. Schomburgk, n. 188.

64. *Hyptis brevipes*, Poit. var. *β*. Benth. l. c. p. 105; forma capitulis majoribus subsessilibus.—Moist Savannahs, Upper Rupunoony. Schomburgk.

65. *Hyptis Parkeri*. Benth. l. c. p. 108.—Sands of the Essequibo, British Guiana. Schomburgk, n. 598.

66. *Hyptis pectinata*, Poit. Benth. l. c. p. 127.—French Guiana. Herb. Par. n. 175.

67. *Marsypianthus hyptoides*, Mart. Benth. l. c. p. 64.—British Guiana. Schomburgk, n. 215.

VERBENACEÆ.

Tribe Verbeneæ.

The order of *Verbenaceæ* has been divided by Bartling, according to the inflorescence, into two tribes, and by Endlicher into three, according to the degree of adherence of the carpellary elements and the consistence of the pericarp. Of these systems Bartling's would appear at once better characterized and more natural, but requires considerable modification in the details.

The *Verbeneæ*, which may be considered as the first tribe following the *Labiatæ*, to which they are closely allied, would be characterized by the simple spicate inflorescence (the flowers solitary, sessile, or rarely borne on short simple pedicels, along a simple rhachis), and the ovules straight, anatropous, and erect from the base of the cells. They are herbaceous, or more frequently shrubby, but seldom if ever really arborescent. The leaves are often divided, but never compound. The calyx remains herbaceous or membranous, nor does it appear to acquire any remarkable extension after the fall of the corolla. The cells of the ovary are often diverging at the base, especially during the growth of the fruit, so as to leave between them a space, either empty in the dry-fruited genera, or filled with pulp in the succulent ones, which space is often described as one or two additional empty cells.

The *Verbeneæ* would comprehend among the genera with a bilocular ovarium: *Spielmannia*, with axillary solitary flowers; *Cryptocalyx, Lippia, Riedelia, Dipterocalyx, Lantana* and *Camara*, with imbricate capitate flowers; and *Aloysia, Bouchea* and *Stachytarpheta* with spicate flowers. Of the genera with a quadrilocular ovarium t would contain *Verbena, Dipyrena, Chascanum, Tamonea, Priva,* ¡*Casselia, Monochilus* (?) and *Chloanthes*.

68. *Cryptocalyx nepetæfolia*, sp. n.—British Guiana. Schomburgk, n. 694.

Also Trinidad, Anderson, and Pernambuco, Gardner, n. 1049. The following are the characters I should propose for this new genus and species :—

Cryptocalyx, gen. n. Calyx membranaceus, tenuissimus, obsolete dentatus. Corolla tubulosa, bilabiata, labiis erectis, superiore brevissimo bifido, inferiore elongato trifido. Stamina 4, didynama, inferiora longiora, omnia antherifera, antheris oblongis bilocularibus. Ovarium biloculare, loculis uniovulatis, ovulis a basi loculi erectis anatropis. Stylus inclusus. Stigma obliquum capitatum. Fructus sponte bipartitus, pericarpio calyceque subevanidis, pyrenis oblongis monospermis. Semina, testa duriuscula tenui, exalbuminosa, embryone recto, cotyledonibus magnis.

C. nepetæfolia. Herba annua, ramosa, basi procumbens sæpe radicans, apice adscendens. Rami crassiusculi, obscure tetragoni, glabri vel pilis appressis paucis onusti. Folia opposita, petiolata, ovato-rhombea, grosse dentata, basi cuneato-truncata et integerrima, 1—1½ pollicaria, utrinque viridia et glabra vel pilis appressis paucis pubescentia. Spicæ ovoideo-oblongæ, axillares, pedunculatæ, solitariæ vel glomeratæ, petiolo breviores. Flores numerosissimi, minuti, sessiles, seriebus circiter 12 densissime imbricati. Rhachis post flores delapsos cicatrizata. Bracteæ cuneatæ, acuminatæ, membranaceæ, complicato-carinatæ, margine ciliatæ, flores parum excedentes. Calyx corollæ tubo dimidio brevior, sub lente minutissime pubescens. Corolla alba, glabra, vix ultra semi-lineam longa. Pyrenes maturitate omnino liberi, graniformes, ⅓ lin. longi.

The extreme tenuity of the calyx, the small erect limb of the corolla, and the more complete separation of the fruit, together with the habit, distinguish this genus from *Lippia.* It is apparently an old plant in herbaria, but I cannot find it described among *Verbenaceæ.* Its habit is rather that of many *Compositæ.*

69. *Lippia microphylla.* Cham. et Schlecht. Linnæa, vii. p. 226. Fructus calyce inclusus bipartibilis sed vix sponte secedens, globosus v. pyrene altero abortiente oblongus, pericarpio tenui sicco.—Stony places in Savannahs, British Guiana. Schomburgk, n. 75.

The genus *Lippia,* as far as I have examined it, appears best limited by Chamisso and Schlechtendal. The pericarp is thicker than in *Cryptocalyx,* and the pyrenes, though easily separable, are yet held together by it. In *Riedelia* the fruit is rather that of *Lantana,* and must therefore be kept distinct from *Lippia,* unless indeed this genus be joined to *Lantana.* *Dipterocalyx* appears also from Chamisso and Schlechtendal's description to be distinct. *Aloysia* is too natural a group to be united to *Lippia,* unless nearly the whole of *Verbeneæ* be considered as one genus.

70. *Lantana salviæfolia.* Jacq. Hort. Schomb. iii. p. 18. t. 285?—British Guiana. Schomburgk, n. 730.

71. *Lantana annua.* Linn. Sp. Pl. 784?—British Guiana. Schomburgk, n. 207.

If *Lippia* be kept apart from *Lantana,* the two sections of the latter genus proposed by Chamisso and Schlechtendal must be adopted as distinct genera. It is for the section *Callioreas* of those authors that I have retained the name of *Lantana.* In it the ovarium is more fleshy than in *Lippia,* less so than in *Camara.* The structure of the fruit is as in *Lippia,* only that the endocarp is harder and woody, and the pericarp is thicker and somewhat fleshy. The species of this genus are in a state of too great confusion to determine the specimens before me with accuracy, without a detailed review of the whole group.

72. *Camara tiliæfolia.*—Lantana tiliæfolia. *Cham. et Schl. Linnæa,* vii. p. 122.—British Guiana. Schomburgk, n. 196.

In *Camara* the ovarium only differs from that of the preceding genera by being rather more fleshy even than in *Lantana,* but the fruit is very different. It is a complete berry, and the pyrenes diverging near the base leave between them an interstice filled with pulp, or perhaps sometimes empty, which has been improperly described as a third sterile cell.

73. *Stachytarpheta elatior,* Schrad. Hort. Gott. Reichb. Icon. Exot. t. 59.—Swamps on the Upper Rupunoony. Schomburgk. It is also Gardner's no. 1106 from Pernambuco.

74. *Stachytarpheta cajenensis,* Vahl, Enum. i. p. 208.—British Guiana. Schomburgk, n. 262.

This species, which I have also from Trinidad, agrees with Vahl's description in every respect, except that Schomburgk states it to be herbaceous, and Vahl describes his as shrubby; but this difference may arise from the age of the plant, or from the difficulty in ascertaining the point from dried specimens.

Endlicher reunites *Stachytarpheta* with *Verbena*; but independently of the habit and stamina, the difference between the bi-ovulated and the four-ovulated ovarium is surely of importance in this tribe, where the genera are all closely allied, though numerous in species. *Melasanthus* of Pohl appears to have been rightly joined to *Stachytarpheta* as a section by Chamisso and Schlechtendal. With *Bouchea* of those authors I am unacquainted. *Dipyrena* of Hooker is not a natural genus, the single species which composes it having the inflorescence and flowers of *Verbena juncea,* and the foliage nearly of *V. aspera*; yet the difference in the fruit, already perceptible in

the ovarium, is so marked, that the genus cannot but be preserved. *Chascanum* of E. Meyer, formed of some old *Buchneras*, and which I had erroneously referred to *Selagineæ*, is a distinct group correctly placed by E. Meyer and by Endlicher next to *Verbena*.

75. *Tamonea spicata*. Aubl. Pl. Guian. ii. p. 660, t. 268.—British Guiana. Schomburgk. French Guiana. Leprieur, Herb. Par. n. 169. Also Bahia. Gardner, n. 899, and Blanchet, n. 2566.

Among the remaining *Verbeneæ*, *Casselia* is a very marked group, so also *Priva*; but it is surely by inadvertence that *Phryma* has been joined to it; for notwithstanding some general resemblance in habit, the structure of the fruit and convolute cotyledons are so very singular, that it can only be considered as an isolated genus not really belonging to any of the great tribes of *Verbenaceæ*. I am unacquainted with *Monochilus* of Fischer and Meyer, which is probably allied to *Casselia*, or with *Buchia* of Humboldt and Kunth, which is surely no true *Verbenacea*, perhaps a *Polemoniacea*. *Chloanthes* of R. Brown, the only four-ovulated genus with a simple axillary inflorescence, is somewhat anomalous in appearance; but the ovarium is that of the true *Verbeneæ*. The central cavity of the fruit is here intersected by the axis, which gives the appearance of two additional empty cells.

Tribe Duranteæ.

These are allied to *Verbeneæ* by their inflorescence, to *Viticeæ* by their more arborescent habit, and by the position of the ovula, which are laterally attached to the fleshy axis of the ovarium, either at their base or above it, but always below the middle. The ovule is thus frequently more or less amphitropous. The calyx generally grows after the flowering is over, and either incloses the fruit at its maturity, or forms an expanded cup under it.

76. *Petræa macrostachya*, sp. n., arborea, foliis ovali-ellipticis breviter acuminatis scaberrimis, racemo elongato, pedicellis fructiferis tubo calycis brevioribus, calycis laciniis lineari-oblongis subspathulatis acuminatis aristulatis. Folia semipedalia. Racemus 1½—2-pedalis, pendulus. Calyces florigeri subsessiles, longiores et tenuiores quam in plerisque speciebus.—On the brook Currassawaak. British Guiana. Schomburgk, n. 158.

Besides *Petræa*, the *Duranteæ* comprehend *Citharexylum*, *Duranta* and *Pöppigia* (Bertero, not Presl.), which last genus has been alternately united with *Citharexylum* and with *Duranta*, having some of the characters of each, but with flowers different from either. There appear to be two species, differing from each other in the size of the flower, the form and size of the berry, and, in some respects, in the form of the leaf, one from Chili, the other from the isle of Juan Fernandez.

Tribe VITICEÆ.

This group is readily distinguished from the two preceding ones by the cymose inflorescence. The ovarium is that of *Duranteæ*, and in some genera there is the same tendency of the calyx to augment after the flowering. The habit is often arborescent, and compound leaves are not uncommon; but no accurate circumscription of the tribe can be attempted until the numerous heterogeneous plants collected under *Clerodendron, Premna* and *Callicarpa*, and many little known Asiatic genera, shall have been more carefully examined.

77. *Pyrostoma ternatum*, C. F. W. Meyer. Flora Esseq. p. 219.—British Guiana. Anderson. Calyx tubulosus, 10—11 lin. longus, tubo basi 10-nervio minute tomentoso, superne ampliato 5-plicato glabro, limbo 5-lobo, laciniis lanceolatis foliaceis acutis. Corolla hypogyna, calycem subæquans, tubo basi glabro, supra insertionem staminum extus ferrugineo-villoso et parum ampliato, limbo bilabiato, labio superiore bilobo, inferiore trilobo, lacinia intermedia majore emarginata. Stamina 4, exserta, didynama, filamentis basi pubescentibus. Ovarium obovoideum, hispidum, 4-loculare, loculis uniovulatis, ovulis basi lateraliter affixis. Stylus filiformis. Stigma bipartitum.

78. *Vitex capitata.* Vahl, Ecl. ii. p. 50, t. 18, *var.* foliolis latioribus subtus pubescentibus.—British Guiana. Schomburgk.

I have received from Sir W. J. Hooker specimens gathered in Trinidad by Mr. Lockhart, answering precisely to Vahl's description and figure. M. Schomburgk's specimens agree with them in everything but the points noted above.

79. *Vitex umbrosa.* Sw. Fl. Ind. Occ. ii. p. 1076.—On the Essequibo. Schomburgk.

A single specimen answering perfectly to Swartz's description, except that the panicle is rather shorter than the leaves.

80. *Ægiphila arborescens*, Willd. Sp. i. p. 616. Manabea arborescens, *Aubl. Pl. Guian.* i. p. 64, t. 24.—Savannahs, British Guiana. Schomburgk, n. 404.

81. *Ægiphila laxiflora*, sp. n., frutescens, glaberrima, foliis brevissime petiolatis ovali-ellipticis obtuse acuminatis basi angustatis, paniculis laxis terminalibus basi foliatis, calycis limbo ampliato breviter quadrifido, corollæ infundibuliformis tubo calyce plus duplo longiore.—British Guiana. Schomburgk, n. 772.

Near *Æ. elata*, Swartz; but it does not appear to be a climber, the leaves are narrower at the base, the panicle is more glabrous, looser and fewer flowered, and the colour is, according to Schomburgk, white, not yellow.

82. *Ægiphila salutaris.* Humb. et Kunth, Nov. Gen. et Sp. ii. p. 249.—British Guiana. Schomburgk.

Chamisso and Schlechtendal have already remarked upon the dioical nature of this genus. My specimens of each of the above three species have all exserted stamens and short included styles, and are consequently probably all male and sterile, although the ovules exist in the ovarium.

83. *Clerodendron fragrans.* Vent. Malm. p. et t. 70.—"Sandy soils by the sides of hills, British Guiana." Schomburgk, n. 475.

There is, however, probably some mistake in the locality. The flowers are all perfectly double and sterile, and it is only a cultivated plant in America.

Tribe Avicennieæ.

In this tribe the inflorescence is generally irregularly racemose, the upper pedicels being usually simple, and the lower ones cymosely trifid. The ovules are attached very near the apex; and as the radicle is always as in other *Verbenaceæ* pointing to the base of the carpels, the ovules are amphitropous, or nearly orthotropous. Besides *Amasonia* and *Avicennia,* I have observed this structure in *Gmelina.*

84. *Amasonia erecta* (Linn. Fil. Suppl. p. 294) perennis v. suffruticosa, erecta v. basi decumbens, pubescenti-scabra v. glabriuscula, foliis ellipticooblongis grosse dentatis basi angustatis, bracteis ovatis acutis basi in petiolum brevem angustatis, calycibus corollisque breviter pubescenti-hirtis. Taligalea campestris, *Aubl. Pl. Guian.* ii. p. 625, t. 252. Amasonia punicea, *Vahl, Ecl.* ii. p. 51.—Savannahs of the Rupunoony Schomburgk, n. 228.

Folia inflorescentia et calyx ut in descr. Vahliana. Corolla 9–10 lin. longa, tubo incurvo, fauce parum ampliata, limbi quadrifidi laciniis reflexis ciliato-fimbriatis, superiore breviore latiore emarginata, lateralibus latis obtusis, infima acutiuscula. Stamina 4, infra medium tubi inserta. Filamenta basi dilatata puberula, cæterum glabra, adscendentia, apice declinata, exserta. Antheræ et stylus ut in descr. Aubletiana. Ovarium quadriloculare? quadri-ovulatum, ovulis ex apice axeos amphitrope pendulis. Baccam maturam non vidi; junior dipyrena videtur globosa, pyrenis dispermis.

Notwithstanding the discrepancies in the descriptions given by the authors above quoted, it seems most probable, as Vahl suspected, that the three are but one species. The pubescence and the bracteæ are very variable. The corolla is said by Schomburgk and Vahl to be red, by Aublet to be yellow; but as the bracts are in all cases red, the more or less yellow in the corolla may be of no importance. The flowers are so much pressed in my specimens, that I could not satisfactorily ascertain whether the ovarium was two- or four-celled.

The following new and very distinct species has been gathered in Brasil by Pohl and by Langsdorff.

A. hirta, perennis v. suffruticosa, erecta, foliis obovato-oblongis basi longe angustatis cauleque hirsutissimis, bracteis oblongis acuminatis villosis, calycibus amplis coloratis corollisque longe pilosis.—Tota pilis flavicantibus obtecta. Calyces coccinei. Corollæ tubus ultrapollicaris, limbi laciniis acutiusculis.

L.—*Metamorphosis observed in the Small Pipe-fish* (Syngnathus lumbriciformis). By Prof. B. Fries*. With Plate XII.

When I had the honour some time since of presenting to the Royal Academy of Sciences an addition to our knowledge of the Scandinavian species of the genus *Syngnathus*, I did not expect that I should so soon again have further occasion to return to the same genus, and to show in another point of view that it merits the attention of Ichthyologists. Such an opportunity has however been afforded by the unexpected discovery of a kind of metamorphosis which I have observed in the smallest of our pipe-fish, *S. lumbriciformis*. In all probability this is not the only species of the genus which undergoes this metamorphosis, but the same may probably occur in all those belonging to the division of *Syngnathi Ophidii*†. As previously I had had no opportunity of convincing myself of this fact, it may be well to publish the preliminary notice of what I have observed, in order to direct the attention of other naturalists to the subject.

After having satisfied myself by some successful trials of the possibility of keeping species of pipe-fish alive for a short time in reservoirs filled with water—which will not in general succeed with our sea fish—it was my intention to inquire into the relation subsisting between the young of the pipe-fish in their tender age and their parents; that is to say, I wished to learn whether the pipe-fish, also, afford their young the protection and care which, as experience has shown, the marsupial pipe-fish extend to their progeny; and, if it were so, in what manner nature had effected this, as the former are not furnished with the marsupial sac which in the latter affords

* Translated from the Swedish into German by Dr. Gans of Stockholm, and inserted in Wiegmann's Archiv, Part III. 1838, whence this is taken.

† For the terms ophidial pipe-fish and marsupial pipe-fish, see Prof. Fries's paper on the genus *Syngnathus*, a translation of which appeared at page 96 of this Journal.—Edit.

to the young so sure a place of refuge. That such a relation must exist between the pipe-fish and their young, analogy appeared to require; and another circumstance which I had noticed seemed to indicate the means by which this was accomplished. The marsupial pipe-fish and ophidial pipe-fish exhibit, as is well known, a great difference in their motions and change of positions. The *Marsupiales*, which possess a stiff short tail, provided with a fin, swim like other fish chiefly by the help of the strokes of the tail. The *Ophidii*, on the other hand, with a long roundish tapering and very flexible tail, without any fin, receive little or no help in their progress through the water from this organ, which is generally kept still during swimming, and may rather be regarded as a helm than as an oar. When the marsupial pipe-fish rests, or remains still, it sinks extended to the ground, and lies on its belly with its tail extended, while the ophidial pipe-fish with great dexterity entwines its flexible tail around any object that may be present. We always see them holding fast in this manner, when they find anything that may be encircled; and even when no such object presents itself, but several individuals kept in the same vessel, frequently the tails are seen entwined round one another, and thus forming groups which in a certain degree resemble the old figures we see of the so-named "Rat-kings." This peculiarity in the ophidial pipe-fish suggested the idea that probably the young might possess this property in a still higher degree, and by this means might fix themselves to the male parent when any danger threatened them. In order to learn whether this was really the case, I procured a living male with eggs attached to the vent, placed it in a separate glass vessel filled with fresh water, and resolved to attempt to keep it alive until the eggs should be hatched and the young should have made their appearance. Chance would have it, that it was just our rarest species, *S. lumbriciformis*, which first fell into my hands, in a condition suitable to my intended purpose. It was towards the end of September that the fish was placed in the vessel with water. He appeared at first to thrive very well, although he refused all nutriment of whatever kind that I offered to him. The water was changed twice a day, morning and evening, when I carefully examined my prisoner. At the commencement of the observations, the

eggs were already so far advanced in development, that the embryons might be plainly distinguished with the lens; but in the course of a few days the outer membrane became so opake, that the changes, going on within, could not be observed any further; and since for my purpose I merely had in view and waited for the hatching of the young, I would not venture to disturb the fish and to deprive him of any of the eggs for closer examination.

After six days my little fish was evidently exhausted, and the eggs began in many places to have a changed morbid appearance, so that I entertained some fear for the result. However, it still lived for some days, and as, on the morning of the ninth day of its imprisonment, I performed the usual examination, I was agreeably surprised to find at the surface of the water three hatched young. They swam in an erect position, very little concerned about one another, and had still less to do with the father, who lay quite still at the bottom. Through the whole forenoon I constantly watched all their motions, but could not perceive the least inclination in them to approach or hold on to the father, nor did he pay them the least attention; in a word, they were all strangers to one another. Somewhat displeased at this coldness of theirs, which destroyed beforehand the whole of my projected theory, I took a lens and observed the young as they were swimming freely about in the water. To my great astonishment I then first perceived that they were provided with locomotive organs quite dissimilar to those which the parents possess. *The entire tail was surrounded by a fin-like membrane*, and *pectoral fins* were distinctly perceivable, which were in a constant vibratory motion, as in the marsupial pipe-fish. As none of our *Ophidii* in their complete development possess any trace of pectoral fins, and are without caudal fins, this discovery that these organs occur in them in their young state came quite unexpectedly upon me; however the fact itself was clear and undeniable. Hence it follows, that these fish, like tadpoles, lose their tail and throw off caudal and pectoral fins at a fixed, but as yet unknown period; a circumstance that has hitherto never to my knowledge been observed in the fish tribe. In the course of the afternoon, a fourth young, and

on the following morning a fifth and sixth, made their appearance; several were not hatched. The whole egg substance exhibited itself in a half dissolved condition, separated itself, together with the adherent cellular substance, from the body, and fell in pieces. The fish died on the same day towards the evening. I now sacrificed two of the young for observation, and endeavoured by constant renewal of the water to retain the others alive, in order to observe their metamorphosis. The experiment, however, did not succeed. On the seventh day of their life they died one shortly after the other. What I observed during the short time they lived was their rapid growth from scarcely three Swedish lines in length to five; otherwise no change occurred in them.

In the annexed plate, M. W. v. Wright has figured with his accustomed accuracy one of these young. Pl. XII. fig. 1. is a side view of it magnified. Fig. 2. from above, and the intermediate small figure indicates the natural size. The entire body is white and transparent, so that the vertebral column and the intestinal canal in the ventral cavity appear through. The head, very large in proportion to the rest of the body, occupies about a sixth of its whole length, has true and distinct eyes, and also the turned-up snout which characterizes *S. lumbriciformis.* The length of the snout in proportion to the other parts of the head is larger in the young than in the old fish. It is also worthy of remark, that while the border of the gill covering in all older *Syngnathi* is connected by a membrane, and the common epidermal covering with the rings of the shoulder, and leaves behind at both sides of the neck merely a small aperture by which respiration is effected, the young have the same border of the operculum entirely free, by which the gill apertures are greater than is generally the case in fish. Fig. 2. shows it quite distinctly. The anal aperture, which occupies its right position relatively to the dorsal fin, lies, however, somewhat nearer to the caudal extremity than in old individuals, i. e. a portion nearly equal to half the length of the body. This aperture in the young fish is more distinguished by the projecting posterior angle which the ventral line forms at this place. The scale plates which in the form of rings cover the whole body in the old fish appear not yet

to be formed; but when the young is observed from above, along both sides of the body a series of fine serrated teeth are seen to project, which can be nothing else than the *processus transversi* proceeding from the vertebræ, which exist in the old *Syngnathi*, and afford direct points of support for the said rings. I think I could count about eighteen such points between the head and anus, and at least 50 between the anus and caudal extremity. The ventral fins, which occupy the same place as in the marsupial pipe-fish, are very small, but distinct; they have an expanded somewhat rounded termination, and only rudimental rays. The motions of these organs are particularly lively. The dorsal fins may also be plainly distinguished, although their rays appear to be merely indicated; from this fin proceeds as prolongation, both forwards and backwards, a somewhat lower fin-like membrane, without the least trace of rays; the anterior continuation gradually decreases in height, and disappears about half-way between the neck and dorsal fin; the posterior prolongation continues, however, along the entire back of the tail, with the same height unto the extremity of the tail, turns round this, and then extends on the under side of the tail to the anus. The caudal fin in the young *Syngnathi* has also the same formation and shape as in the eel, and forms one of its chief natatory organs.

Such dissimilarly formed locomotive organs as we meet with in the small pipe-fish, as young and as old individuals, are explained by the different kind of locomotion which it employs at these various periods of life, and this again seems to indicate quite a distinct habit. To inquire more accurately into this point, as also to determine the period and kind of the metamorphosis, remains yet for future observations.

I take this opportunity of mentioning that the delicate young *Syngnathi* are perhaps of all things the best suited for microscopical examinations on the circulation of the blood.

LI.—*Information respecting Botanical Travellers.*

Again, on June 8th, Mr. Gardner writes thus from Pernambuco *: "Ever since my return from the Rio San Francisco, I have been anxiously expecting the parcels and letters of which this day has

* In continuation of the extracts given in our last Number, p. 365.

put me in possession; and their receipt having set my mind at ease respecting the welfare of my friends, and the safety of those collections which I had sent home, I sit down to write a few lines. Since I returned hither, I have collected about a hundred species of plants almost entirely different from anything I had found before. Among them are some very noble Grasses. I have secured seeds of the fine new *Melocactus* which I mentioned in my last letter; so that if the living plants should fail, I still hope it may be reared. There are also two pods of a large leguminous tree from the banks of San Francisco among the articles which are immediately to be despatched for England; several specimens, in a living state, of an Orchideous plant that I believe to be *Monachanthus fimbriatus*, growing in a box, together with a large-flowered *Epidendrum*.

"The rains here continue very heavy; it is impossible to stir abroad without being drenched. I have been waiting some time for a vessel to convey me to Avacati, which is to sail in a few days; thence I intend to go to a place called Teó, about 200 miles inland, where I shall remain some time, and if all be well, go across the mountains into the province of Piauhy. I find that it is requisite to purchase four horses at least, which, with their trappings, cost about 50*l*. A very good black servant, who has already been in my employ for five months, will accompany me.

Pernambuco, July 18th.

"After many delays, in consequence of being unable to find a vessel bound to Avacati, in the province of Ceara, I have the satisfaction to tell you that my arrangements are finally made to sail in a few hours; as, however, there has been one incessant pour of rain for the last two months, I could have done nothing in the way of collecting, which partly reconciles me to the delay in starting. From Avacati I still intend to make my way as quickly as possible to Teó, 240 miles inland, where, if I find a good field for botany, I may stay for a few months, and shall then probably pass into the province of Piauhy. At all events, I do not think of returning to Pernambuco for eight or ten months, if any more; but shall not fail to seize every opportunity of letting you know how I get on. A long time may elapse ere I can again have the satisfaction of receiving news from Europe." G. Gardner.

In Southern Africa, our valued friend, the Honourable W. H. Harvey, is zealously devoting his leisure hours to acquiring a more perfect knowledge of the botany of that extensive and yet but partially explored country. He is printing at Cape Town an account of the genera hitherto discovered, and is giving every possible encouragement

couragement to the German botanist and collector Zeyher, to continue his researches in the more remote parts of the colony where he has already been very successful, especially in Uitenhage and Albany. It was intended that he should have proceeded to the eastward, much beyond the colony; but this is now out of the question. "Any excursion beyond the boundary," our correspondent observes, "the state of the country forbids. You will have seen by the papers, that many thousands of Dutch boors, not satisfied with our government, emigrated in the course of last year into the Zooloo country to seek 'peace and quietness,' as they said, from the mild and paternal sway of the Zooloo chief, Dingaan, who was civil enough at first, for they did not alarm him—coming, as he said, *in fews and fews*; but when the main body arrived, the savage took his measures, and succeeded in cutting off the leader of the boors, and many of his chosen men. Since that, the whole country has been disturbed, and actions have taken place between the parties with various success. The population of Port Natal is almost massacred to a man, the Missionaries and Captain Gardner have fled, and the property of white persons in that country has been carried off by Dingaan. It will take a long time to restore matters to a steady footing. The main body of the boors, though having twice lost their leaders, still hold out; and till they or Dingaan be completely crushed, Zeyher must keep within bounds. I hope to settle him this coming season among the mountain districts of George, Auteniqualand, Zivartsberg, &c.; Kuysna to be his head-quarters, where Mr. Rex, who is still living and well, will gladly afford him hospitality. It is now, however, (August) about four months too early for that country, and these cannot be better spent than in Uitenhage and Albany, where, I have no doubt, he will find out many plants that have escaped others; in fact, I have boundless confidence in the resources of novelty still in this country. He has already found a new *Myrtus* (not *Memecylon Capense*), a tree 30 feet high, which I have called *Myrtus Zeyheri*; and from his present quarters (Uitenhage), he sends me almost by every post something or other interesting, and is most ready to poke out every little oddity I call for, or to send fruit and seeds for dissection, buds for æstivation, and such like; in fact, he spares no pains to please me."

The collections of such a man, and from such a country, cannot fail to be valuable to the botanists in Europe; and we have requested that several sets may be sent to England, which he will (Mr. Zeyher) be able to afford at the price of 2*l.* the 100 species.

BIBLIOGRAPHICAL NOTICES.

Ornithological Biography, or an account of the Habits of the Birds of the United States of America. By John James Audubon, F.R.S. L. & E., &c. Vol. iv. 1838. Royal 8vo. London, Longman. Edinburgh, A. and C. Black.

For a very long period the illustrated works devoted to Natural History in Great Britain were considered inferior in their execution, and in the scope of their plan, to those published in France and Germany. The splendid works of Levaillant and Vieillet, of Meyer and Wolfe, and of Humboldt, in Zoology and Botany, mostly published either immediately previous to, or about the commencement of, the present century, were looked upon as the height of finish which plates of this character could be brought to, and as the models which future naturalists were to endeavour to equal. At the period alluded to, the continent still continued to advance in its beautiful volumes published at the national expense, which accompanied every voyage of discovery, and without which, indeed, the record of the expedition was looked upon as incomplete. They combined the progress of science with the improvement of the arts which a few years gradually carries with them; but it was perhaps not much before the year 1820 that British naturalists began to revive the character of their illustrated works, by attention to the pictorial department. At the present time this will bear the palm both for execution and composition, while it approaches very near to the minute accuracy for which the productions of the continent are still deservedly famed.

The illustrations of Mr. Audubon's remarkable work were commenced in Edinburgh, so far as we can recollect, about 1826, at first under comparatively little encouragement, from the circumstance of subscribers thinking that the requisite expense and labour could not be continued with regularity; and it is a proud thing for the metropolis of Scotland to say, that this gigantic work was undertaken there, after having passed the cities of America and France and England, while it is equally gratifying to know that the plates executed there can bear comparison with the best of those which have been elsewhere engraved. This part of the work, "comprising four hundred and thirty-five plates, with one thousand and sixty-five figures, was finished on the 20th of June last;" and although some of the plates might be justly criticised, we should be illiberal indeed were we to endeavour to pick out the minor faults of a series so extensive, and containing many pictures beautiful both in drawing and composition.

The descriptive portion of the work, or the 'Ornithological Bio-

graphy,' is also nearly completed. The third volume was published immediately after an arduous voyage to the coasts of Labrador, for the purpose of examining the breeding stations of the northern birds; and after returning to England, and spending the time requisite for arranging the materials derived from that journey, another expedition is again undertaken to the southern states of America, and we have many of the results now before us, in the first part of the concluding volume of the work.

Mr. Audubon's previous volumes have been so frequently extracted from for the amusement and information of the general reader, that the manner in which he treats his subjects is familiarly known, and we shall now interfere with little criticism. The style is undoubtedly peculiar; and from the pen of any other, or from that of an imitator, it would read and sound extremely affected; but knowing the man, and thinking that we hear him tell the tale while we read it, every feeling is lost in the freshness of the picture, and in the truthfulness of the detail. A little want of courtesy is sometimes manifested towards those whom he may think do not possess sufficient knowledge of the North American Fauna, and some disdain is exhibited towards the opinions of systematists; but while he points out those traits of habit which frequently confirm the "suspicions" of the theorist he condemns, he cannot resist generalising himself, according to the manners of the birds which he has had such ample opportunities of studying, and which he has so often beautifully described; and if he would bear this in mind, he might perhaps find some apology for the ornithologist who mourns that various causes do not permit him to enjoy the advantages of the "woodsman," and who only ventures to turn his recorded practical knowledge to the formation or support of his own opinions.

The volume before us is scarcely so original as its predecessors, owing to many of the species having been procured from other travellers, and the accounts of their habits taken from the notes which they furnished. It was scarcely to be expected that one individual could personally examine the habits of all the birds of so vast a tract, and a general history would have been incomplete without the introduction, so far as known, of every species. We miss also the 'Episodes' which gave such vivid accounts of scenery,—the forest and prairie, the flood and war of elements, the chase, and the manners of the squatter and woodsman. This part is here occupied with anatomical details by Mr. Macgillivray. Mr. Audubon, during his last journey, having brought over many specimens in spirits, they have been dissected, and their anatomy is now illustrated by bold

wood-cuts, which has added to our limited stock of facts on this branch of ornithology. Several new species are also described in this volume, but on which we dare scarcely venture an opinion, without having the birds before us; some of these are the acquisitions procured during the journeys undertaken by American travellers, and are very interesting. The reader will also find the descriptions of some of our native birds during the season of incubation, which do not breed in our own islands. We shall add a few notices of some of the latter, and also of those for which Mr. Audubon claims both an American and British parentage, but which other ornithologists have considered distinct. We take them as they occur in the volume.

The Turnstone, *Strepsilas Interpres*, is plentiful on the southern coasts of the United States, and was observed in April and May in Texas and Mexico; it was however looked for in vain on the Labrador coast, and its breeding-places were not discovered. Mr. Audubon makes the following remarks on its affinities: "I have always looked upon the Turnstone, while at its avocations, as a species very nearly allied to the Oyster-catcher; and although it certainly differs in some particulars, were I to place it in a position determined by its affinities, I should remove it at once from the *Tringa* family. Its mode of searching for food around pebbles and other objects, the comparative strength of its legs, its retiring disposition, and its loud whistling notes while on the wing, will, I think, prove at some period, that what I have ventured to advance may be in accordance with the only true system." We have little doubt that our author is here right; and this bird and *Hæmatopus* have elsewhere been shown to be the medium by which the connexion was wrought out between the *Ardeadæ, Scolopacidæ* and *Charadriadæ*. It is a bird easily tamed, and like the Oyster-catchers, thrives well where access can be given to a supply of water.

The Great Northern Diver, *Colymbus glacialis*. The American range of this bird is very extended; it has been "met with in winter on all the water-courses of the United States. I have seen it along the whole of our Atlantic coast, from the Maine to the extremity of Florida, and from thence to the mouths of the Mississippi and the shores of Texas. It occurs on the waters that fall into the Pacific, and has been observed on the Columbia rivers; in the fur countries it is plentiful." In its incubation it resembles the black-throated species, placing the nest sometimes near the water, and sometimes a short way distant, in the latter case having a path wrought by the passage of the bird to and from it. The eggs Mr.

Audubon considers to be most frequently three in number; he has experienced and confirms the speed and excellence of their diving and progressing under water, and acknowledges himself "outdone by a loon." We consider that this bird, if unhurt, can beat any oared boat without rising from the waters.

Common Tern, *Sterna Hirundo.* "Although the Prince of Musignano states that the bird named the Common Tern in America differs from that bearing the same name in Europe, and has, in consequence, changed its appellation to that of Wilson's Tern, I am of opinion that no difference exists between the Terns of the two continents." If we have read the prince's works aright, we think this is not the case. The prince, in his observations on Wilson's nomenclature, considers the European and American species identical; in the 'Osservazione sulla seconda edizione del Regno Animale,' *Wilson's plate* only is said to be quoted as referring to another species, the *St. Wilsoni*, Bonap.; and in the latest work, 'Comparative List of the Birds of Europe and North America,' published in 1838, *St. Hirundo, Arctica* and *Dougallii* are all given as common to both continents, while *St. Wilsoni* (the *St. Hirundo*, Wilson, not Linnæus,) is marked as American only, and *St. minuta* is represented by *St. argentea*, Nuttal. This seems the real state of the species, and Mr. Audubon has taken unnecessary trouble in making comparisons for this purpose, though they may be of use in teaching us the range of variations to which species may be subject.

Spotted Sandpiper, *Totanus Macularia*, occurred abundantly from Texas to the shores of Labrador, breeding and rearing their young in the whole range. This species seems to be more careful than usual in the building and selecting a station for the nest: in an island in the Gulf of St. Lawrence, they were placed among the tall slender grass; and in Labrador they were concealed under ledges of rocks extending several feet over them, were made of dry moss from six to nine inches high, and well finished with slender grasses and feathers of the Eider Duck.

Long-tailed Duck, *Harelda glacialis.* Ranges as far south as Texas and the mouth of the Columbia river, and breeds by the fresh-water lakes on the coast of Labrador. The nests were placed under bushes eight or nine feet from the edge of the water, and were formed of rather coarse grass, with a layer of finer weeds, covered with the down of the birds.

The Knot, *Tringa cinerea.* Found ranging along the coast far south, but was unsuccessful in finding its breeding stations, which seem yet among the desiderata of the European ornithologist. Cer-

tain countries are given as retired to during the season of incubation, but we fear, in most instances, without sufficient authority.

Lesser Tern, *St. minuta.* Mr. Audubon gives the bird of America under the foregoing name without comment. Mr. Nuttal places it distinct as *St. argentea,* and the Prince of Musignano follows the latter ornithologist, and keeps it also distinct. At present we cannot judge of the correctness of these opinions; the habits of the birds in both continents seem extremely similar, and a curious fact is mentioned regarding the structure of their nests. In the southern and middle districts it scoops merely a slight hollow in the sand, as it does in Britain, where we have seen the nests; but on the coast of Labrador they "form very snug nests," formed of dry moss well matted together, and nearly as large as that of the American Robin, *T. migratorius.*

Little Sandpiper, *Tringa pusilla,* Wils. Under this title the Little Sandpiper figured by Wilson, pl. 37, is described without any European synonym; and the whole small species mentioned by Temminck and others are disclaimed as American,—an opinion countenanced by that of Bonaparte, who has omitted them in his last comparative sketch; we, however, yet think it requires investigation to show that the European birds are not found in, or are not identical with, that of America. The little bird in question was found breeding abundantly on the moss-clad crests of the highest rocks on the coast of Labrador, within a short distance of the sea.

Solan Goose or Gannet, *Sula Bassana,* is considered by Mr. Audubon as identical in America with the bird of the Bass-rock. The Prince of Musignano, in his last work, gives it as different, under the title of *S. Americana,* but has not mentioned the differences.

Gooseander, *Mergus Merganser.* During the season of incubation closely resembles the Red-breasted species, *M. Serrator,* so abundant on our northern lochs. The former has not yet been discovered breeding in Britain; but in America, the interior of the states of New York, Massachusetts and Maine, are much frequented by it. The nest is generally placed on a small island, is very large, sometimes raised seven or eight inches on the top of a bed of all the dead weeds which the bird can gather in the neighbourhood; it is rather neatly formed of fibrous roots, lined round the edge with the down of the bird. The eggs seven or eight in number, and of a uniform dull cream colour.

Golden-Eye, *Clangula vulgaris.* The habits of this bird in America seem exactly similar to those which frequent the lochs and streams of Britain during the winter; and the fact of the species

breeding in the hollows of trees, as recorded by Mr. Hewitson, is here confirmed; the only specimen seen by Mr. Audubon, while incubating, being discovered in the cavity of a large broken branch. It is a curious situation to be selected, in all the instances we know of, by a duck so decidedly and expertly aquatic in its habits; but Mr. Audubon also states that, to his great amazement, he once saw a small flock, on being disturbed, fly to some distance, and alight on the large branches of a sycamore tree which hung over the creek. Bonaparte gives the bird of America as distinct, under the name of *C. Americana.*

Hen-Harrier, *Circus cyaneus*, is said to be identical in both continents, contrary to the latest decision of the Prince of Musignano. The habits of these birds in the different countries seem to vary very little, and we incline to consider them alike; at the same time there are one or two varieties in the plumage which are pretty constant.

Sand-Martin, *Hirundo riparia.* Described as identical with the British birds, but still placed by Bonaparte with a query. Following the description of this swallow we have that of another closely allied and considered new, under the name *H. serripennis*; it is peculiarly marked by having the outer webs of the quills elongated into hooks, to judge from the wood-cut of the parts, similar to what we observe in some of the owls and night-breeding birds.

Many of the other descriptions in the volume may be perused with much interest, particularly those of the Brown Pelican, Snake bird, Avocet, Black Skimmer, &c., where we have minute relations of the manners, such as none but an observer, and one devoted to his subject, could relate.

Genera Plantarum secundum Ordines Naturales dispositæ; auctore Stephano Endlicher. Vienna. 1836, &c.

Of this valuable publication, which may be considered a new edition of the 'Genera Plantarum' of Jussieu, and of which we gave an announcement in the 'Companion to the Botanical Magazine,' v. ii. p. 191, seven parts are now before us, and an eighth, we believe, has also reached this country. Here, as in the work just alluded to of Jussieu, the arrangement is begun with the least perfect plants, and the vegetable world is divided into kingdoms (regiones), sections, cohorts, classes, orders, sub-orders, tribes, genera. The characters are copious, drawn up with great care. The first *regio* is entitled Thallophyta, and includes what are familiarly known as *Algæ, Lichens* and *Fungi.*

The second *regio* is entitled Cormophyta; in it we have the *He-*

paticæ, Mosses, Equisetaceæ, Ferns, with their allies, the *Zamiæ, Rhizantheæ, Glumaceæ, Restiaceæ,* and the rest of the monocotyledonous plants included in the first four sections. The section ACRAMPHIBRYA, we presume, corresponds with the Dicotyledones, of which the first cohort is GYMNOSPERMÆ, including the *Coniferæ,* &c.; the second cohort APETALÆ, (including *Monochlamydeæ,*) and the third cohort is GAMOPETALÆ; commencing with *Plumbagineæ,* which is immediately followed by the class called AGGREGATÆ, comprising *Valerianeæ, Dipsaceæ* and *Compositæ,* which latter occupy a good part of the fifth, the whole of the sixth, and a portion of the seventh part, which breaks off with the *Rubiaceæ.*

As an accompaniment to the above work, the same learned author is editing an

'*Iconographia Generum Plantarum,*' of which we regret that only the first fasciculus, with twelve plates in 4to, has reached our hands; but three parts, we understand, if not four, are published. Under the superintendence of so accomplished a botanist as M. Endlicher, and with engravings from the drawings of the late Frederic Bauer, the companion of Mr. Brown during his researches in Australia, it will not surprise our readers if we speak of this work as of first-rate importance in the botanical world. The figures are in outline, and the analysis very full and satisfactory. Tab. 1. represents a most remarkable Fungus (one of the *Gasteromycetes Phalloidei*), *Ascröe pentastictina,* Endl. Tab. 2. *Cœlachne pulchella,* Br. Tab. 3. *Anguillaria dioica,* Br. Tab. 4. *Eustrephus latifolius,* Br. Tab. 5. *Gastrodia sesamoides,* Br. Tab. 6. *Eriochilus autumnalis,* Br. Tab. 7. *Lyperanthus nigricans,* Br. Tab. 8. *Caleya major,* Br. Tab. 9. *Gymnostachys anceps,* Br. Tab. 10. *Doryphora Sassafras,* Endlich. (one of the *Atherospermeæ*). Tab. 11. *Pimelea punicea,* Br. Tab. 12. *Symphyonema montanum,* Br.

Icones Floræ Germanicæ, sive Collectio compendiosa Imaginum characteristicarum omnium Generum atque Specierum quas in sua Flora Germanica recensuit Auctor Ludovicus Reichenbach.

Under this title Dr. Reichenbach has long been conducting at Leipzig a very extensive work, of which twelve centuries are completed, and which contain an immense number of coloured figures, with ample dissections, of German plants; and seeing how nearly the Flora of Britain is related to that of the German empire, we cannot but regret that this valuable publication is not so well known among our countrymen as it deserves to be. As far as the tenth century, the plates were generally each devoted to a single species,

sometimes two or more, so that they contain but 1331 species; and these are published without any systematic arrangement, though accompanied with very complete indices. With the eleventh century an important change has taken place, and the first 110 plates are devoted to the illustration of all the German Grasses, here estimated at 402 species. The twelfth century illustrates, in an equally satisfactory manner, a scarcely less difficult family, the *Cruciferæ.* These occupy 98 plates, and embrace 233 species. The following four plates are devoted to the *Resedaceæ.* Here are thus an immense quantity of plates, and a great number of analyses brought forward in a small compass, and yet so well arranged, as to present no confusion to the eye. Whatever may be thought of the propriety of making, in several instances, so many species upon very slight grounds, the accuracy of these figures, whether of species or varieties, cannot fail to throw much light upon this difficult department of botany; and the price is extremely moderate.

Icones Fungorum hucusque cognitorum. Auctore A. C. J. Corda. Pragæ, 1838.

The second number of this valuable work has appeared. The execution of the figures is even better than that of the first part, noticed at page 61 of this Journal, and it is no less full of interest and information. We are happy to observe that he has figured several species from the specimens published by Fries in the 'Scleromycetes Sueciæ,' on the structure of which he has thrown quite a new light, as in *Agyrium rufum,* &c. We hope that he will continue this useful practice, as the illustration of described species is of far greater importance than the putting forth of new and hastily formed genera.

Linnæa, ein Journal für die Botanik, &c. Vol. XII. Parts 2, 3, 4, 5. 1838.

[Continued from vol. i. p. 477.]

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F. L. Schlechtendal.—Corrections and additions towards the knowledge of *Ceratophylleæ*; by Dr. Schleiden.—On a new species of *Serapias*; by Dr. Parlatore.—On three new Mexican mosses; by E. Hampe.—Extract from a letter to the Editor on the hot baths of Atonilco el grande in Mexico.—Reliquiæ Schraderianæ.—Observations on some European species of *Gladiolus*.—Cursory intelligence respecting Mexican *Coniferæ*; by the Editor.—Additions and corrections to the genera and species of *Ericeæ*; by J. F. Klotzsch.—On the development of stomata; by Prof. Mohl.—Additions and corrections concerning the Hercynian Flora; by Hampe.—On Mexican plants; by Schlechtendal.—Contributions towards the knowledge of monstrosities in plants; by Hampe.

Work in the Press.

Mr. James F. Stephens, author of the 'Illustrations of British Insects,' is preparing for publication a series of Manuals descriptive of all the species of British Insects. The first volume is to contain the whole of the British beetles.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

April 24.—R. C. Griffith, Esq., in the Chair.

Mr. Waterhouse exhibited a new species, from the Society's Collection, of *Gerbillus*, and a new *Herpestes*, which were accompanied with the following descriptions.

HERPESTES FUSCA. *Herp. fusca; pilis nigro flavoque annulatis, ad basin fuscescentibus; gulâ fusco-flavâ; caudâ, quoad longitudinem, corpus ferè æquante, pilis longissimis obsitâ.*

	unc.	lin.
Longitudo *capitis corporisque*	18	0
——— *caudæ*	17	0
——— *tarsi digitorumque*	3	6

Hab. India (Madras?)

"This species is about equal in size to the *Herpestes major* or *urinatrix* of the Cape, and hence is larger than any of the Indian species hitherto described. It approaches in colour nearest to *Herp. brachiurus* of Mr. Gray, but may be distinguished by its very long and bushy tail. The claws of the fore feet are remarkably large and of a brown colour; the longest claw measures upwards of three quarters of an inch; the feet are blackish. Each hair of the back is grayish brown at the base, then pale brown, and the apical half is

black, generally with about three or four yellowish rings. At a little distance the animal appears to be of a deep brown colour.

"The skins from which the above description was taken were purchased at a sale of zoological subjects, the greater portion of which were from Madras. As, however, there were some from the Nilgherries, it is possible these specimens may have come from that quarter.

GERBILLUS CUVIERI. *Gerb. suprà colore flavescenti-cinnamomeo; gulâ, abdomine, pedibusque niveis; auribus mediocribus; caudâ longissimâ; tarsis longis.*

	unc.	lin.
Longitudo ab apice rostri ad basin caudæ	7	1
——— *caudæ*	8	0
——— ab apice rostri ad basin auris.....	1	6
——— *tarsi digitorumque*	1	8¾
——— *auris*	0	7

Hab. India. (No. 473. in Catal. of the *Mammalia* in the Zoological Society's Museum.)

"General colour very bright cinnamon yellow; the hairs of the upper parts of the body gray at the base; cheeks whitish, a white spot above, and extending behind the eye; the feet and the whole of the under parts of the animal white; the hairs of the same colour at the base as at the *apex*; tail brownish above, dirty-white beneath, the apical third furnished with long blackish hairs; ears blackish, sparingly clothed with white hairs; hairs of the moustaches black, some of those nearest the mouth white.

"This species of *Gerbillus*, which I have great pleasure in naming after M. F. Cuvier, who has published so excellent a monograph on the group to which it belongs, I have reason to believe has long been confounded with the animal described by Major-General Hardwicke, in the eighth volume of the Linnean Transactions, under the name of *Dipus Indicus*. The chief character which induces me to consider it as a distinct species, consists in the comparatively great length of the *tarsus*. In a specimen of *Gerb. Indicus*, which exceeds the present animal in size, I find the *tarsus* to be only 1 inch and 6 lines in length; and in a specimen in the Paris Museum the foot was only a quarter of a line longer, this animal being likewise larger than the specimen which furnished the above description. In the same museum there is also a specimen of the present species, in which the *tarsus* measured 1 inch 9 lin.; the length of the animal being 7 inches 10 lin. In the specimen of *Gerb. Indicus*, and that of *Gerb. Cuvieri*, belonging to the Zoological Society's Museum, there is a considerable difference in the colouring, the latter being paler, and of a much

brighter hue than the former; but whether this difference is constant I am not aware."

May 8, 1838.—The Earl of Sheffield in the Chair.

Mr. Waterhouse brought before the notice of the Meeting an extremely interesting series of skins of *Mammalia,* which had recently been given to the Society's Museum by George Knapp, Esq., who had received them from the Island of Fernando Po. The collection included the following seven species, which were considered by Mr. Waterhouse as hitherto undescribed; namely, two new *Colobi,* forming a most important addition to that group of *Quadrumana* of which our knowledge is so extremely limited, from the small number of skins brought to Europe; two new species of *Cercopithecus*; a new Antelope, a new Otter, and a new species of the genus *Genetta.*

These were severally named by Mr. Waterhouse, and the following descriptions and specific characters communicated.

Colobus Pennantii. *Col. suprà nigrescens, ad latera fulvescenti-rufus; subtùs flavescens; caudâ fusco-nigricante; genis albis.*

Longitudo *capitis corporisque,* 27 unc.; *caudæ,* 29 unc.

Hab. Fernando Po.

"The prevailing colour is bright rusty-red; the head, back of the neck, and the central portion of the back, are black; the cheeks and throat are white or dirty white; chest, fore part of the shoulders, the under parts of body and inner side of the limbs are dirty yellow; inner side of the thighs whitish; the hairs of the tail are brownish black. The fur is long and not very glossy; that on the head and fore parts of the body being the longest. There is no soft under fur; the hairs are of an uniform colour to the base, or at least in a *very slight* degree paler at that part. The portion of the back which is described as black partakes slightly of the rusty hue which prevails over the other parts of the body; it occupies but a narrow portion of the back, and blends indistinctly into the rust colour. The lower parts of the limbs are removed, but as they are black at the knee, and also assume a deep hue below the elbow, it is probable the remaining portions are black externally; but *internally,* as far as can be seen, the limbs are yellowish or yellow-white.

"There was scarcely any perceptible difference in the colouring in all the specimens examined by me, from Fernando Po, amounting to about eight in number. They invariably had white or dirty-white cheeks and throat.

"This species is the nearest yet found to the Bay Monkey of Pennant, but differs in having the throat and cheeks white, and in ha-

ving three distinct shades of colour on the body; Pennant's animal having the cheeks of a pale bay colour, and the body deep bay above, and pale bay beneath. It might be argued that by 'deep bay' Pennant meant to designate the peculiar colour described by me as black with a rusty hue: if so, he could scarcely apply the term '*very bright bay*' to the parts which I call yellow. If, however, even this were the case, there is still another distinct tint which he has not mentioned, and that is the bright rusty-red colour of the sides of the body and limbs. On the whole, therefore, I think I am right in applying a name to the animal here described, which it must be remembered is from a different locality; that of the Bay Monkey being Sierra Leone. There is another circumstance which should lead us to be cautious in pronouncing any species which differs as much as that here described, as identical with Pennant's animal, since it so happens that each red *Colobus* discovered has in its turn been referred to the Bay Monkey, or to the *Simia ferruginea* of Shaw, which is the same animal, and has had one or both of these names applied, but has been changed upon the discovery of the next species; in consequence of which much confusion has arisen. I think we had better let the *Bay Monkey* stand until we can find an animal agreeing with Pennant's description,

Colobus Satanas. *Col. niger; vellere longissimo.*

Longitudo *capitis corporisque,* 31 unc.; *caudæ,* 36 unc.

Hab. Fernando Po.

"Of this species I have seen three skins from the same locality; one of these was very imperfect; the other two were perfect, with the exception of the hands and feet. Its uniform black colour will at once distinguish it either from *Colobus leucomeros,* or *Col. ursinus,* the former having white thighs and a white throat, and the latter having a white tail, and long grey hairs interspersed with the black on the neck. The longest hairs on the back measure ten inches. The fur is but slightly glossy, and the hairs are of an uniform colour to the base. There is no under fur.

Cercopithecus Martini. *Cerc. pilis corporis suprà nigro et flavescenti-albo annulatis; capite suprà, brachiis caudâque nigrescentibus; gulâ abdomineque griseo-fuscescentibus.*

Longitudo *capitis corporisque,* 22 unc.; *caudæ,* 26 unc.

Hab. Fernando Po.

"Of this animal I have seen but two skins: both very nearly agree in colouring but differ slightly in size; the dimensions are from the larger specimen. The face, hands, and feet, are unfortunately

wanting. It appears to be most nearly allied to *Col. nictitans*; the hairs of the upper parts of the body, however, are more distinctly annulated, and the general tint is somewhat greyish. Each hair is grey at the base, and has the apical portion black, with, generally, three yellowish-white rings. The crown of the head and the fore legs are black; the hind legs are blackish, the hairs being but obscurely annulated. The throat is dirty white, the belly and inner side of the legs at the base are of a brownish colour. The tail is black above, and somewhat grizzled at the sides. At the base of the tail beneath there are some deep reddish-brown hairs. The naked callosities are small. The hairs on the fore part of the crown of the head are black, annulated with brownish-white, and so are those on the side of the face immediately below the ear. The fur is tolerably long, and but loosely applied to the body. In the smaller specimen the under parts of the body are somewhat paler than those in the larger, being brownish-grey.

"I have named this species after my fellow curator Mr. Martin.

Cercopithecus erythrotis. *Cerc. griseus; pilis corporis suprà flavo nigroque annulatis; gulâ genisque albis; brachiis nigrescentibus; caudâ splendidè rufâ, lineâ nigrescente per partem superiorem excurrente, apice nigrescente; regione anali auribusque rufis.*

Longitudo *capitis corporisque*, 17 unc.; *caudæ*, 23 unc.

Hab. Fernando Po.

"This beautiful little species is about the same size as the Moustache Monkey (*Cerc. cephus*), and has undoubtedly a close affinity to that animal; it may, however, be distinguished by the bright rusty-red hairs which cover the ears internally, its brilliant red tail, and by the hairs in the region of the *anus* being also of a bright red.

"The hairs on the upper parts of the body are black annulated with yellow; on the hinder part of the back the yellow assumes a deep golden hue, but, unlike the Moustache Monkey, the black prevails over the yellow. On the sides of the body and the outer side of the hinder legs, the hairs are greyish; and on the belly and inner side of the limbs, they are greyish-white. The fore legs are blackish externally; a dark mark extends backwards from the eye to the ear; below this, on the cheeks, there is a tuft of white hairs, beneath which the hairs are grizzled black and yellow,—in these respects bearing a close resemblance to the Moustache Monkey. The face is imperfect, and the feet have been removed from the skin; these parts, therefore, cannot be described.

Genetta Poensis. *Gen. fulvescenti-fusca; dorso lineis nigris confluentibus et irregularibus notato; lateribus maculis nigris crebrè adspersis; caudâ nigrâ, annulis fulvis interruptis.*

Longitudo *capitis corporisque*, 26 unc.; *caudæ*, 18 unc.

Hab. Fernando Po.

"This species probably approaches nearest in affinity to the *Genetta Pardina*, Is. Geoff., but is distinguished from all the African species with which I am acquainted, by its deep rich yellow-brown colouring, and by the great number of dark markings and spots with which its body is adorned.

"On the back of the neck there are three or four slender longitudinal black lines, which are irregular and indistinct, especially near the head. On each side of these slender lines there is a broad, irregular black mark, which commencing behind the ear runs backwards and outwards over the shoulders; here the slender black lines appear to divide, for as many as seven can be traced; the outermost of these diverge, and are soon broken into irregular spots, which are scattered over the sides of the body. The intermediate lines are also broken into oblong spots, excepting that line which runs along the spine of the back, which is uninterrupted, and becomes broader on the middle of the back. On the hinder half of the back there are, on each side of and parallel with the spinal black mark, two lines formed by confluent spots. The sides of the neck are adorned with numerous oblong spots. The muzzle is black; there is a slender black line between the eyes, a yellow spot below the anterior angle of each eye; the tip of the muzzle is also yellow. The lips are blackish, and the eyes are encircled with black hairs; the hairs of the moustaches are brown, black and brown. The ears are black at the base externally; internally they are covered with yellowish hairs. The limbs are brownish-black. The tail is black; on the basal half there are five narrow yellowish rings, and on the apical half there are about four rings of a brownish colour, and somewhat indistinct. The fur is short, glossy, and adpressed.

Lutra Poensis. *Lut. nitidè fusca; genis mento guláque fulvescentibus.*

Longitudo *capitis corporisque*, 24 unc. 3 lin.; *caudæ*, 13 unc.

Hab. Fernando Po.

"The only specimen of this Otter which I have seen is smaller than the common European species (*Lutra vulgaris*); its colour is much brighter, being of a rich yellowish-brown; the sides of the face (immediately below the ears), the sides of the muzzle, and the throat, are of a rich deep golden-yellow with a faint brownish hue.

The ears are small, and covered with hairs of the same colour as those on the top of the head. The tip of the muzzle is bare. The moustaches and long bristly hairs on the sides of the face are brown, paler at the base, and blackish at the *apex*. The tail is about equal to half the whole length of the animal. The fur is short, and the hairs are nearly erect; the under fur is of a brownish-white colour, glossy silk-like nature, and tolerably abundant. There are no feet to the skin.

Antilope Ogilbyi. *Ant. splendidè fuscescenti-aurata, subtùs pallidior, lineâ dorsali nigrâ; collo fusco lavato; caudâ brevi et floccosâ, nigrescente, pilis albis subtùs interspersis.*

Hab. Fernando Po.

"The small bushy tail, the character of the fur, which is short and closely adpressed, and the colouring, all indicate in this species, I imagine, an affinity to the *Ant. scripta*, with which it appears to agree in size. The brown neck, deeper and richer colouring, and the absence of white markings on the body, however, will serve to distinguish it from that species. As in *Ant. scripta*, there is a black line along the spine of the back.

"The skin from which the above description is taken is without head or limbs. The length from the shoulders to the root of the tail is about two feet eight inches. The tail is about four and a half inches.

"If my conjectures regarding the affinities of this animal prove correct, it will belong to the sub-genus *Tragelaphus* of Hamilton Smith, or to the more extended group to which Mr. Ogilby has applied the name of *Calliope*.

"I have taken the liberty of naming this animal after the author last mentioned, whose careful researches in the Ruminant animals have thrown considerable light on the affinities of the species."

Mr. Waterhouse then proceeded to notice two skins which had been just brought from Sierra Leone by Major Henry Dundas Campbell, (late Governor of that Colony,) and sent by him for exhibition at the Society's evening meeting, with a promise on the part of Major Campbell to present them to the Museum, in the event of his being able to make an arrangement with a party to whom he had parted with them as an article of commerce. One of these specimens was a remarkably fine skin of a species of *Colobus*, described by Mr. Ogilby in the Society's Proceedings under the name of *Col. ursinus*; the skin, however, upon which Mr. Ogilby founded his species was imperfect, and until the opportunity afforded by the inspection of the present specimen, nothing was known of the colour of the head and face, which prove to be greyish white.

The other skin was a new species of the genus *Cercopithecus*, for which the name of *Cerc. Campbelli* was proposed, with the following character.

Cercopithecus Campbelli. *Cerc. vellere perlongo, subsericeo, per dorsum medium diviso; capite corporeque anteriore grisescenti-olivaceis, pilis nigro flavoque annulatis; corpore posteriore femoribusque extùs intensè cineraceis; gulâ, abdomine, artubusque internis albis; brachiis externè nigris; caudâ pilis nigris et sordidè flavis indutâ, apice nigro, pilisque longioribus instructo.*

Longitudo *capitis corporisque*, 20 unc.; *caudæ*, 28 unc.

Hab. Sierra Leone.

"This species appears to be most closely allied to the *Cercopithecus Pogonias* of Mr. Bennett; it has not, however, the black back which serves to characterize that animal.

" The most remarkable characters in this animal are its long fur, and the hairs being divided on the back, as in most of the species of the genus *Colobus*. The average length of the hairs of the back is about two and a half inches; on the hinder half of the back, however, they exceed three inches. These hairs are grey at the base, and the remaining portion of each hair is black, with broad yellow rings, the latter colour prevailing. On the posterior half of the body, and the outer side of the hinder legs, the hairs are of a deep slate grey, and almost of an uniform colour; some of those on the middle of the back are obscurely freckled with deep yellow, and those on the thigh are very indistinctly freckled with white. The belly, inner side of limbs, fore part of thigh, chest and throat are white. The hairs of the cheeks and sides of neck are very long, and of a greyish-white colour, grizzled towards the apex with black and yellow; some whitish hairs tipped with black are observable across the fore part of the forehead. The inner side of the ears is furnished with very long hairs of a greyish-white colour, obscurely annulated with grey and pale yellow; these hairs vary from three quarters to one inch in length. The fore legs are black externally, and the hairs on this part are comparatively short. The hairs on the upper side of the tail are grizzled with black and dirty yellow, and on the under side with black and brownish-white. The apical portion of the tail, which is furnished with longish hairs, (as in *Cerc. Pogonias*), is black, the black hairs occupying about one third of the whole length of the tail.

" I have named this animal after the late Governor of Sierra Leone, Major Campbell, that gentleman being its discoverer."

Mr. Ogilby exhibited and described various species of Kangaroo

Rats (*Hypsiprymnus*) from the Society's Collection, and read extracts relating to them from a paper which he had prepared upon the subject so long ago as the year 1832; and which, though partly read before the Linnæan Society at that time, had never been made public, owing to the imperfection of the materials then in this country for the perfect illustration of the genus. Reserving the detail of his observations for an express monograph, Mr. Ogilby briefly characterized the following species :—

1. *Hyp. setosus*: described in the Proceedings for 1830–31, p. 149.

2. *Hyp. myosurus*: easily distinguished from all the other species by its much shorter tail and *tarsus*; the former organ being scaly, as in the true Rats.

3. *Hyp. melanotis*: a large species with longer ears than its congeners, and readily distinguished by the dark brown colour of the hair which covers the organs, as well as by its superior size.

4. *Hyp. formosus*: a beautiful small species of a light russet-brown colour, the latter half of the tail white.

5. *Hyp. Phillippi*: pale brown, with a slight shade of russet above, dirty white beneath; tail long, cylindrical, covered with short, adpressed yellowish-white hairs beneath, and with reddish-brown woolly fur on the upper surface, terminated by a tuft of dirty yellowish-brown; ears elliptical; head small and attenuated; *tarsus* long, and of a pale greyish white colour; middle upper incisors not so much longer in the lateral as in *Hyp. murinus*, and lower shorter and slenderer; the canines are nearly in contact with the lateral incisors, and of the same form and size. This is the species described in Governor Phillipp's Voyage: that figured by White appears to be *Hyp. myosurus*.

6. *Hyp. Cuniculus*: in size and colour something resembling *Hyp. Phillippi*, but of a clearer grizzled brown colour, something like that of the wild rabbit; a dark brown patch marks the nose; tail long, cylindrical, and terminated by a tuft of coffee-coloured wool; upper middle incisors very large, separated from one another and truncated; the lower of the same form, but considerably shorter than in any other species, and the canines much smaller than the contiguous lateral incisors, and separated from them by a distinct bar or vacant space; by all which characters this animal differs from *Hyp. Phillippi*, as well as by its larger and thicker head and clearer grey colour.

7. *Hyp. murinus*: of nearly the same colours as the last two species, but readily distinguished by its short, thick head, blunt, unattenuated muzzle, and very short ears bordered with red: the teeth

also afford a very distinctive character; the lower incisors are twice as long as in the last species, the upper not much longer than the lateral, and the canine only half the size of the contiguous incisor, and nearly in contact with it, being separated only by the third part of a line; the tail is furnished with an erect crest of black hair for three or four inches towards the tip: this is the "Potoroo" of the French Zoologists, as Mr. Ogilby had verified by comparison with the Paris specimens.

Mr. Martin then brought before the notice of the Meeting three species of Chameleon from Fernando Po, forming part of Mr. Knapp's donation, and upon which he proceeded to offer the following observations.

"Among the collection of specimens from Fernando Po lately presented to the Zoological Society are three chameleons of peculiar interest. One of them is the *Cham. tricornis*, or *Oweni* of Mr. Gray; the second is the *Cham. cristatus* of Mr. Stutchbury, described and figured in the 3rd Part of the 17th Vol. of the Linn. Trans. The third appears to me to be undescribed.

"With regard to the specimen of *Cham. cristatus*, I may be permitted to point out some trifling differences between it and the figure given by Mr. Stutchbury, The crest ceases to be elevated over the loins and base of the tail, degenerating into an acute ridge; whereas in the figure it continues for a considerable distance along the upper aspect of the tail, and is as elevated over the loins as over the chest. The tail is shorter in proportion in the present specimen; the indentations which margin the casque are less bold and decided, and the casque itself is less produced posteriorly. The dorsal crest is supported by only ten spinous processes. The colour is slate gray, with a yellow abdominal line, but without the orange and dark reticulated lines observed by Mr. Stutchbury in his specimen. Length of head and body $3\frac{1}{2}$ inches: tail, $2\frac{3}{4}$ inches.

"As the specimen described and figured by Mr. Stutchbury came from the river Gaboon, Western Equinoctial Africa, and the specimen belonging to the Zoological Society from Fernando Po, it is possible that they may be examples of permanent varieties; but I am rather inclined to attribute the difference to age or sex, or to both combined. Mr. Stutchbury's specimen is probably an adult male; that belonging to the Zoological Society is a young female. The *Cham. Oweni*, Gray (*Cham. tricornis*, Gray), differs from a specimen from Fernando Po, (collected by Lieut. Allen) in the possession of the Society, only in having the horns less developed. With respect to the species I regard as undescribed, I beg to offer the following observations:—

"At a first glance this Chameleon might be confounded with *Cham. Senegalensis,* or with *Cham. dilepas* ; the grainlike scales of the body and the general contour of the head and body being much alike in each. When, however, we come to examine more closely, we shall find sufficient reason to regard it as entirely distinct. Both in *Cham. Senegalensis* and its immediate ally (if it be truly a separate species), *Cham. dilepas,* the dorsal ridge and also the median line of the throat and abdomen are strongly denticulate. In this, however, neither the dorsal ridge, nor the abdominal or gular median line, present any such character. In *Cham. Senegalensis* the tail is remarkably stout at the base, the skin behind the knee-joint is close, and there is a sort of heel, or angular projection (at least in the specimens before me), at the posterior junction of the two portions of the hind-foot. In the Chameleon which I regard as undescribed the tail is slender at the base and long, the skin behind the knee-joint is loose and fanlike, and there is no angular projection or heel. The granulations of the body, it may also be observed, are much less acutely elevated (being smaller and rounder) than in *Cham. Senegalensis.*

"The casque between the eyes is comparatively narrower, being there contracted; it is broader and more rounded however posteriorly, and is less produced. The middle line or keel is a little more distinct; and between the eyes the casque is more deeply and abruptly concave; a very small flap or ear, which indeed might easily be overlooked, is produced from the posterior part of the casque, and lies on each side of the neck, as in *Cham. dilepas*; but as we have said, in this species the dorsal ridge and the median line of the throat and belly are strongly denticulate, or as Daudin said of its ally the *Cham. Senegalensis,* '*dentelés en scie.*'

"Regarding then this species as hitherto undescribed, I propose for it the name of *Chamæleon Bibroni,* as a tribute of respect to M. Bibron, of the Musée d'Histoire Naturelle of Paris.

"The characters of *Cham. Bibroni* may be summed up as follow: Casque (or upper surface of the skull) flat, with a very slight occipital keel; contracted and concave between the eyes, rounded posteriorly: superciliary ridge very little elevated, and becoming obsolete over the nostrils; a small flap on each side from the posterior edge of the casque lies on the neck; the dorsal ridge and median line, both of the throat and belly, destitute of a denticulated crest. The grains of the body and limbs small and close-set, those of the casque flat and angular.

Chamæleon Bibroni. *Galeâ planâ; vix apud occiput carinatâ;*

inter oculos angustâ et concavâ; posticè rotundatâ, et lobo parvulo utrinque instructâ; margine superciliari parùm elevato, et super nares obsoleto; culmine dorsali, lineâque mediâ per gulam et abdomen tendente, absque denticulis; corpore granis parvis et confertis tecto; galeâ lamellis angularibus.

Longitudo corporis cum capite, 4 unc.; *caudæ*, $5\frac{1}{2}$.

Hab. in Insulâ Fernando Po.

"In proportion to the size of the body the head of *Cham. Bibroni* is short, and particularly the muzzle, which is very acute at the apex. Viewed from above the helmet it would present an elongated *oval*, rounded behind and acute anteriorly, were it not for its contraction between the eyes, which is not the case in *Ch. Senegalensis*. The accessory lobes at its posterior part are very small, and might easily be overlooked. Perhaps, however, they may be larger in the male, (for the present individual, it is to be observed, is a female,) but of this I have no means of judging. The length and slenderness of the tail are remarkable. The granulations of the body are small and even. The general colour is purplish black, passing on the sides of the belly, on the loins, and posterior limbs, into olive-green; the inside of the limbs, and the median line of the abdomen, are pale reddish-yellow."

WERNERIAN NATURAL HISTORY SOCIETY.

The first meeting of the Session took place on Saturday, Dec. 15, 1838, Dr. Greville, V.P. in the Chair.

The first communication read was upon "The Geology of the neighbourhood of Kelso, by C. Le Hunte, Esq." There was next read a paper by Sir John Graham Dalyell "On a singular mode of Propagation among the Lower Animals," by which last phrase the *Zoophyte group* is to be understood. The communication was accompanied by beautiful and delicate engravings, preparing for a splendid work on the Zoophytes with which Sir John has for years been engaged. The following modes of propagation among different members of the group were referred to,—by means of ova; through the medium of an animal discharged from an external cyst of the parent, which, after enjoying active motion for a time, becomes stationary, is metamorphosed, and thus attains its perfect state. It was likewise remarked, that from the *Hydra tuba*, which is a *Hydra* proper, prominences bud externally, which are at first shapeless, and on being detached become perfect animals; and also, that an animated moving corpuscule, which may, as such, be artificially liberated from *Actinia*, will become a perfect fœtus if retained,

and will be produced by the parent from the mouth in its own similitude. From the several details, Sir John remarked that it may be deduced, first, that two different modes of propagation carry on the race of *Actinia*; one whereby the embryo, a shapeless corpusculum, endowed with locomotion within the parent, is produced symmetrically by the mouth, but is then deprived of the power of motion, or nearly so; the other, whereby a fragment buds externally from the base, thus generating after the fashion of the *Hydra tuba*. Second, that the *Aplidium verrucosum*, a compound *Ascidia*, is originally an inert ovum, next an embryo endowed with an active locomotive faculty, and in the third stage is converted into an animal of a form absolutely different, riveted to one spot. Third, that the Zoophytes of certain genera pass through intermediate stages towards perfection, of which that stage exhibiting them endowed with the faculty of locomotion is not the first.

Dr. Trail then made a verbal communication concerning the traces of the (so-named) *Cheirotherium* occurring in the New r Red Sandstone in Cheshire, near Liverpool, illustrated by specimens, casts, and engravings. This communication gave rise to an animated discussion, in which Dr. Trail, Professor Jameson, Mr. Stevenson, and Dr. Greville took a leading part, and in which on the one side doubts and scepticism were expressed as to the evidence satisfactorily establishing the unequivocal traces of the foot-marks of any quadruped whatever.

MISCELLANEOUS.

ON THE FUR SEAL OF COMMERCE.

In the December Number of the 'Annals,' Mr. J. E. Gray has noticed my paper * on the "Fur Seal of Commerce" which appeared in October last †. Mr. Gray considers that the figure and information given are insufficient to recognise the animal, and requests me to extend my description, that he may be enabled to ascertain whether the *Fur Seal* is the same with his *Leptonyx Wedellii*, which he described in 1837 from two specimens presented to the British Museum by Capt. Fitzroy.

With regard to my allusion to the figure, it was introduced in a *note*, and not in the body of the paper, as a compliment to a very deserving artist; and until Mr. Gray has seen the *drawing*, and compared it with a specimen of the *Fur Seal* either alive or dead, we

* Page 309 of the present volume. † p. 81.

can scarcely consider him as competent to judge of its merits or demerits.

With regard *again* to the scientific characters of the animal as they are given in the body of the paper, Mr. Gray desiderates further information respecting "the teeth, the whiskers, the ears, and various other parts." But of "the teeth" I could say nothing, my description being taken from the stuffed specimens of the animal destitute of the crania; of "the whiskers," I stated that "the whiskers are brownish-black, five rows being present;" of "the ears," that "they are black, narrow and pointed, one inch in length, and situate 5 inches 6 lines from the tip of the snout;" and of the other parts and members of the animal I gave descriptions and measurements so detailed as might have exposed me to the risk of being considered needlessly prolix. In common with Mr. Gray, I regretted the absence of the crania, and professed to give the specific characters only "so far as my opportunities permitted."

But while my description was thus avowedly and necessarily defective—in regard more especially to the teeth and crania—I am happy to think that it is still amply sufficient to satisfy the leading and immediate object of Mr. Gray's inquiries, which is whether the Fur Seal is the same with his "*Leptonyx Wedellii*." Whatever else is done by my description, it at least establishes (as Mr. Gray himself observes), that the Fur Seal "is an Otary or Eared Seal." Now upon turning to the description of his "*Leptonyx Wedellii*" referred to by him, as contained in the 'Magazine of Natural History' for 1837, I find, according to the statement there given, that *it* belongs to a group which have "grinders with many roots, *ears* none, toes simple, soles and palms hairy." The Fur Seal then being "an Otary or Eared Seal," and the *Leptonyx Wedellii* having "*ears none*," how is it possible that they should be the same animal? It will be observed too, that the *Leptonyx Wedellii* has "*soles and palms hairy*," whereas my description of the Fur Seal bears, "the *under portion* of both extremities—to the extent of *two-thirds* of the anterior, and *nearly the whole* of the posterior—are *naked, being quite destitute of both hair and fur*." There are other marks of obvious distinction; but when it appears that the one seal is an Otary and the other not, it may justly be deemed superfluous to insist on any other distinctive features; and Mr. Gray's immediate purpose may be held to be sufficiently attained.—Robert Hamilton.

CURIOUS HABIT OF EARTH-WORMS.

While staying at Whitley, near North Shields, Mr. Fryer pointed out to me that the worms (*Lumbrici*), which are abundant on the south

side of his gravel walk, just under the shade of the tuft, where the walks are seldom used, gather together in a head all the loose stones within 6 or 8 inches of their hole, and heap them over its opening, sometimes to a considerable height. The holes when the stones are removed are large, and there are often also a few straws projecting from them. I do not recollect to have observed any similar habit in the worm in the neighbourhood of London; they are probably a different species.—J. E. Gray.

OCCURRENCE OF *ATRIPLEX ROSEA.*

Atriplex rosea, lately added by Mr. Babington to the Flora of the Channel Islands, is I apprehend not uncommon on most of the coasts of England; it is mentioned in Dillenius's edition of Ray's Synopsis, as growing near Maldon, in Essex, and near Selsey, in Sussex, in both which counties I have known it more than fifty years, and having cultivated it, have always with Samuel Dale considered it as distinct from *Atriplex patula,* though in opposition to the great names of Ray, Petiver, Hudson, Smith, &c. I am much pleased now to find my opinion confirmed by that of so able an investigator of British plants as my friend Babington.—Edw. Forster.

THE ANIMAL OF *MODIOLUS DISCREPANS.*

The mantle lobes of this animal are free all round, except at the hinder edge, in the upper part of which they emit a short truncated contractile tube. The hinder part of the lower edges of the mantle, when the animal is expanded, is slightly produced, and folded on the edge of the shell. The foot is rather large and moveable, extensile, becoming strap-shaped, extended in front, with a small flattened disk at the end, and keeled along its lower edge. This foot is sometimes bent back to the hinder opening of the mantle lobes, but it is generally produced in front, and the animal uses the disk at the end of it to enable it to turn itself from side to side, and to place itself in an erect position when it walks by extending its foot to its utmost length, and thus advancing the shell and body along the whole extent of the foot at each move. It also creeps with the foot on the surface of the water, with the shell downwards like a *Cyclas*; and it has the power, like that genus, of crawling up the smooth surface of glass or china. When the animal slides on the surface of the water the gills can be distinctly seen; they extend quite to the base of the tube. I could not observe the course of the water in their shell, but in the young of the common *Modiolus* (*Modiolus barbatus*) it entered in currents, coming from all sides of the shell into the spaces between the two lobes of the mantle, in the middle of the in-

ferior side of the shell, and was emitted, but without any force, at the opening on the middle of the hinder end of the shell.—J. E. Gray.

VESPERTILIO LEISLERI.

Since the account of the *Vespertilio Leisleri* appeared in the 'Annals of Natural History,' the bat has been examined by the Rev. L. Jenyns, who is of opinion that it is not a specimen of *V. Leisleri*, but is at present undecided whether it is the young of the Noctule or a distinct species.—Thomas Paine, Jun., *Great Yarmouth.*

We have to state, that with regard to our note at page 349 in Mr. Babington's Paper 'On the Botany of the Channel Islands,' that it was founded on a misapprehension originating from a misprint. On referring to Mr. Babington's manuscript, we find that the word "confirmed", rather hastily and indistinctly written, was mistaken by the compositor for "conferred"; and that Dr. Boott had merely pronounced it to be *Carex punctata*, Gaud., and not that he gave a name to it already applied to another species, an oversight very unlikely to have been made by one so thoroughly acquainted with the genus, and whose monograph is anxiously looked for.—Edit.

METEOROLOGICAL OBSERVATIONS FOR DECEMBER 1838.

Chiswick.—Dec. 1. Clear: rain. 2. Fine: heavy showers, with strong wind and thunder and lightning at night. 3, 4. Fine. 5. Drizzly. 6. Fine. 7. Rain. 8. Clear: frosty. 9. Frosty and foggy. 10. Frosty: fine. 11—13. Hazy. 14, 15. Foggy in the mornings: fine. 16—19. Hazy and cold. 20. Frosty: fine. 21. Hazy. 22—24. Rain. 25. Very clear. 26. Frosty: heavy rain at night. 27. Clear. 28. Frosty. 29. Overcast: rain. 30. Rain. 31. Clear and fine.

Boston.—Dec. 1. Fine: rain P.M. 2. Fine: rain early A.M. 3. Fine. 4. Fine: rain early A.M. 5. Cloudy. 6. Fine. 7. Cloudy: rain early A.M. 8—10. Fine. 11—13. Cloudy. 14—16. Fine. 17, 18. Cloudy. 19. Cloudy: rain P.M. 20, 21. Cloudy. 22—24. Rain. 25. Fine: snow early A.M.: snow P.M. 26. Fine: rain P.M. 27, 28. Fine. 29, 30. Cloudy. 31. Fine.

Applegarth Manse, Dumfries-shire.—Dec. 1. Dull and cloudy: wet P.M. 2. Frequent showers. 3. Dull and cloudy: temperate. 4. Cleared up: very mild. 5. Clear sunshine. 6. Dull and cloudy: shower P.M. 7. Generally clear: shower P.M. 8. Fine day: frosty P.M. 9. Dry, but cloudy. 10. Cloudy and moist. 11. Clear and frosty. 12. Thick fog A.M.: cleared: moist. 13. Cloudy and raw. 14. Clear and sharp. 15. Dull and threatening. 16. Fog: cleared up P.M. 17. Dull and cloudy. 18. Cloudy A.M., but cleared up. 19. Cloudy and threatening: rain. 20. Raw after rain preceding evening. 21. Cleared and cold: wet P.M. 22. Dry and cold, but threatening rain. 23. Dry: still looking dull. 24. Dry A.M.: moist P.M. 25. Dry and clear: freezing P.M. 26. Wet and stormy till evening. 27. Frosty: ground very slippery. 28. Frost A.M.: thawed P.M. 29. Clear, but still soft. 30. Wet and stormy all day. 31. Showery and unsettled.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1838. Dec.	Barometer.						Thermometer.								Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick. Max.	Chiswick. Min.	Boston. 8½ a.m.	Dumfries-shire. 9 a.m.	Dumfries-shire. 9 p.m.	London: Roy. Soc. Fahr. 9 a.m.	London: Roy. Soc. Self-register. Max.	London: Roy. Soc. Self-register. Min.	Chiswick. Max.	Chiswick. Min.	Boston. 8¾ a.m.	Dumfries-shire. 9a.m.	Dumfries-shire. 9p.m.	London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
○ 1.	29·552	29·557	29·345	29·02	29·29	29·03	46·7	52·0	45·2	56	48	47	42½	48½	S.	SW.	calm	SW.	...	·22	...	...	42
2.	29·464	29·493	29·432	28·90	29·05	29·05	52·7	53·2	46·2	50	44	51	47	46½	S.	SW.	calm	S.	·144	·51	·07	...	46
3.	29·464	29·476	29·457	28·90	29·12	29·15	46·7	55·0	46·0	53	39	45	45½	43	S.	SW.	calm	S.	·577	·02	...	...	44
4.	29·564	29·937	29·558	29·03	29·42	29·55	42·2	48·8	42·5	50	34	41·5	40½	39	SW.	W.	calm	SW.	...	...	·06	...	41
5.	29·834	30·131	29·871	29·33	29·85	30·10	40·9	48·6	38·9	48	35	43	42½	33	W.	NW.	calm	SW-N	...	·01	...	0·92	40
6.	30·256	30·304	30·276	29·76	30·12	30·09	41·8	47·2	40·8	47	29	36·5	45	46	S.	W.	calm	S.	·022	·20	...	...	36
7.	30·256	30·379	30·272	29·80	30·25	30·36	47·7	48·6	40·5	47	32	46	37½	35½	NW.	NW.	calm	WNW	·158	·09	·06	...	43
☾ 8.	30·362	30·461	30·376	29·98	30·45	30·45	38·8	48·7	37·6	44	26	33	36	34	NW.	N.	calm	SW.	·102	...	...	...	37
9.	30·412	30·441	30·381	30·03	30·37	30·29	33·8	41·0	32·9	35	25	34	35	33	NW.	NW.	calm	W.	...	...	...	...	33
10.	30·280	30·316	30·224	29·88	30·15	30·15	33·7	38·3	30·0	44	32	32	41	37	NW.	NW.	calm	W.	...	...	...	...	32
11.	30·288	30·407	30·321	29·87	30·30	30·28	39·9	40·6	33·7	45	35	39	27½	33	SW.	SW.	calm	NE.	...	...	...	...	34
12.	30·342	30·368	30·350	29·92	30·20	30·15	41·3	44·3	39·6	45	39	38.5	40	42	SW.	SW.	calm	SW.	...	...	...	0·07	36
13.	30·326	30·413	30·335	29·90	30·17	30·27	43·2	44·7	41·6	46	37	43	43	43	S.	W.	calm	SW.	...	...	...	...	38
14.	30·410	30·421	30·406	29·94	30·44	30·40	42·8	45·9	42·8	46	32	38	31	32½	NW.	N.	NW.	NE.	...	...	...	...	38
15.	30·366	30·375	30·346	29·97	30·32	30·25	40·6	46·2	41·0	45	28	36·5	35	40	ENE.	SE.	E.	SW.	...	...	...	...	38
16.	30·360	30·411	30·383	30·	30·29	30·35	38·4	43·3	38·2	38	31	26·5	37	40	E.	SE.	calm	S.	...	...	...	...	33
● 17.	30·366	30·396	30·355	29·95	30·32	30·30	35·6	39·8	35·4	37	33	36	37	33	SE.	N.	calm	SW.	...	...	...	...	34
18.	30·316	30·343	30·295	29·99	30·23	30·15	35·3	36·6	34·9	38	31	33·5	32	33	SSE.	NE.	calm	SE.	...	...	...	...	32
19.	30·224	30·257	30·202	29·85	30·05	29·95	34·6	36·3	33·4	42	26	32	31	34½	SSE.	SE.	W.	ESE.	...	...	...	0·08	30
20.	30·192	30·348	30·223	29·80	29·98	30·23	36·7	37·3	34·9	43	28	35	40	39	S.	SE.	W.	NW.	...	...	·06	...	32
21.	30·364	30·397	30·210	30·	30·25	30·02	35·8	36·7	35·7	38	30	36·5	40	36	SE.	SE.	calm	ESE.	...	...	...	...	35
22.	30·104	30·397	29·988	29·75	29·95	29·81	35·8	38·3	34·2	46	37	33	37	37	S.	SE.	SE.	ENE.	...	·30	·05	...	33
23.	29·572	29·593	29·386	29·23	29·39	29·32	42·8	43·7	36·0	46	42	42	39	44	E.	SE.	SE.	E.	·311	·03	·12	...	36
☽ 24.	29·310	29·478	29·312	29·05	29·43	29·55	41·8	44·4	41·8	43	31	40	40½	40	E.	SE.	SE.	E.	·047	·01	·03	...	37
25.	29·658	29·954	29·700	29·29	29·85	29·98	34·5	35·7	34·2	37	21	32	30½	29	NW.	N.	SE.	NE.	·016	...	...	...	32
26.	29·918	29·949	29·472	29·48	29·58	29·35	29·7	34·8	29·8	41	32	28	32½	36½	S.	S.	calm	SSW.	...	·20	...	1·80	27
27.	29·662	30·065	29·706	29·26	29·58	29·87	34·8	39·2	30·0	44	27	35·5	35	34	SW.	W.	calm	W.	·147	...	·34	...	31
28.	30·230	30·383	30·247	29·79	30·18	30·05	33·8	40·8	33·8	40	25	35	32	29½	W.	W.	calm	SSW.	...	...	...	...	31
29.	30·222	30·248	30·235	29·70	29·85	29·99	39·9	40·8	33·8	49	43	37	44½	42½	S.	SW.	W.	W.	...	·08	...	...	33
30.	30·152	30·313	30·169	29·52	29·68	30·05	47·4	48·2	40·2	51	32	48	45	35	S.	W.	W.	S.	·033	·05	...	...	38
⊙ 31.	30·496	30·601	30·487	29·91	30·34	30·34	36·8	50·7	36·2	44	30	36	36	40½	WNW.	W.	calm	WSW.	·044	...	...	...	35
Mean.	30·075	30·181	30·042	29·96	29·948	29·965	39·6	43·5	37·5	44·45	32·7	37·7	38	37·¾					Sum. 1·601	1·72	0·79	2·87	Mean. 35·7

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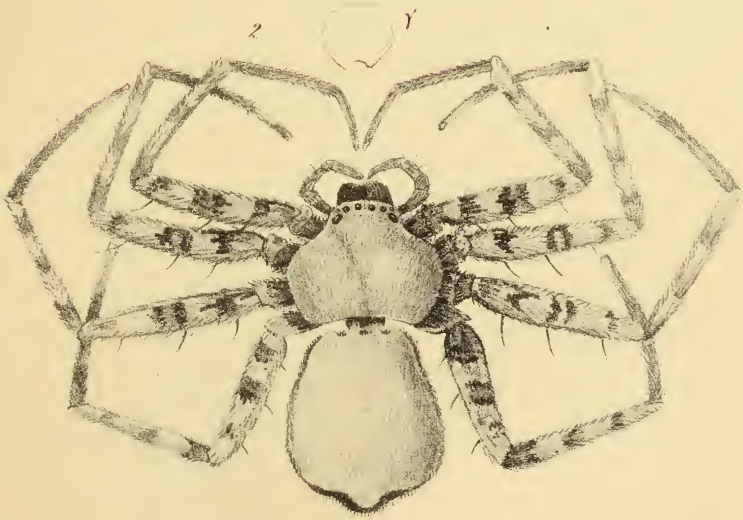
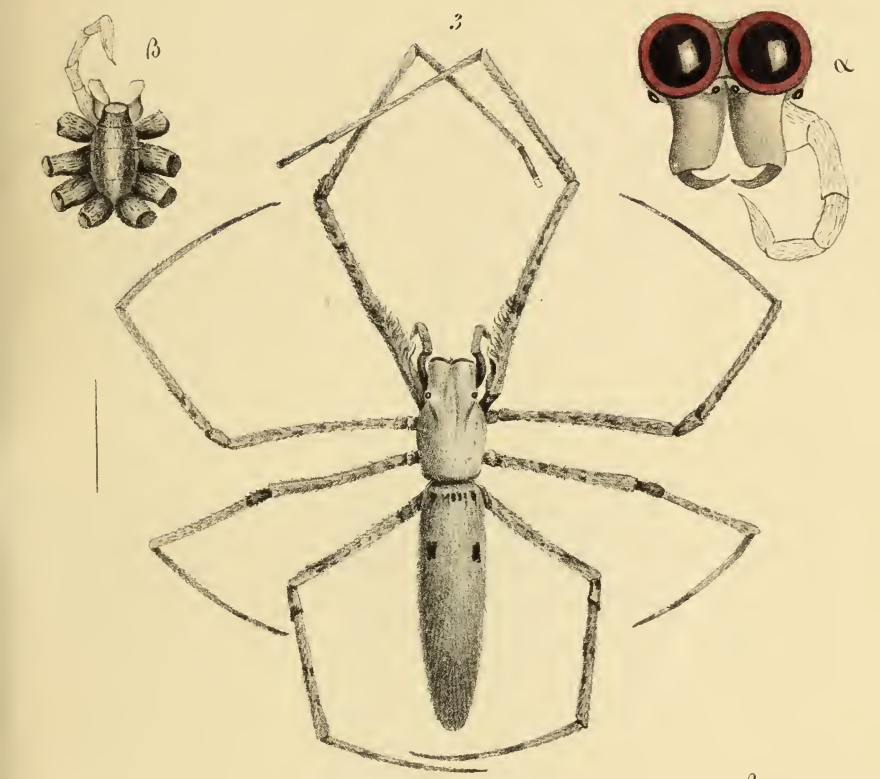
Nops Guanabacoæ

Myrmarachne melanocephala.

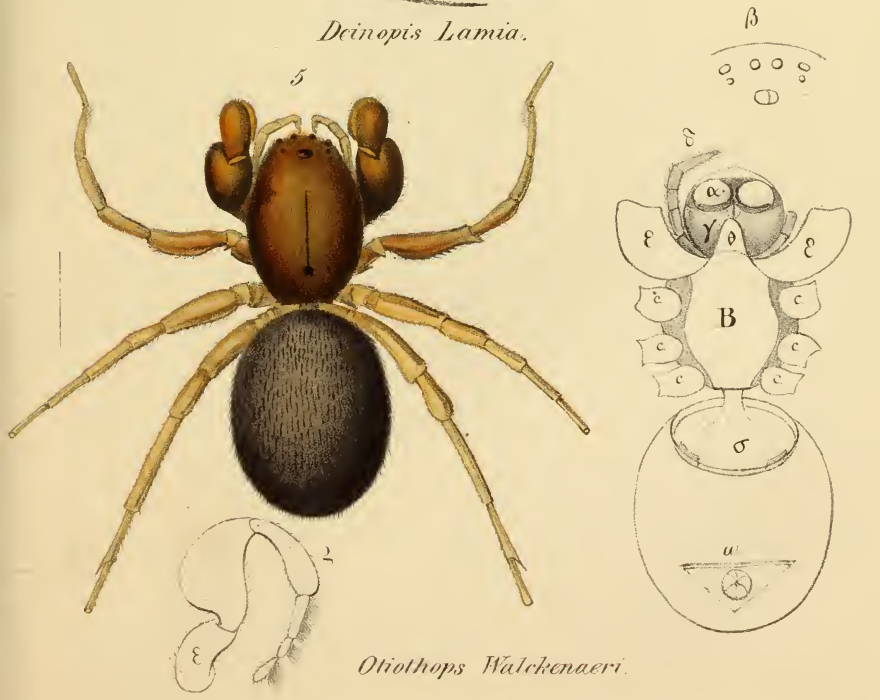


Hypoplatea coler

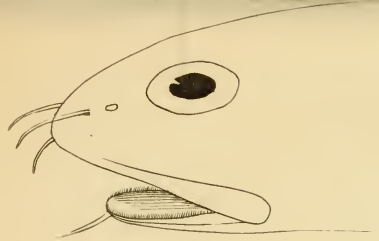
T. Bosire lith

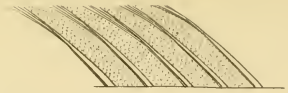


Deinopis Lamia.

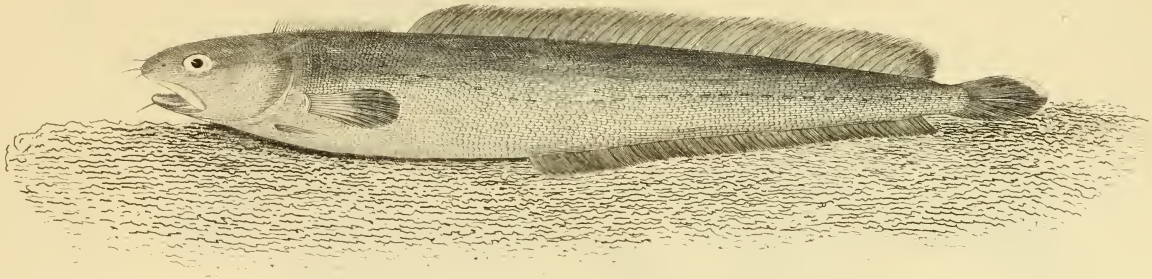


Otiothops Walckenaeri.





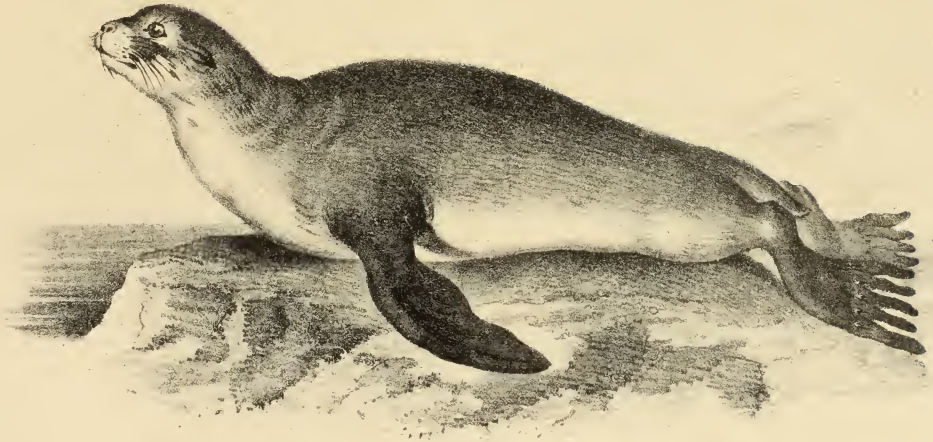
Middle portion of dorsal fin.



Motella cimbria length 14 inches

Four-bearded Rockling

R. Parnell.



Stewart del. J Basire, lith.

Fur Seal of Commerce. Otaria Falklandica.

1
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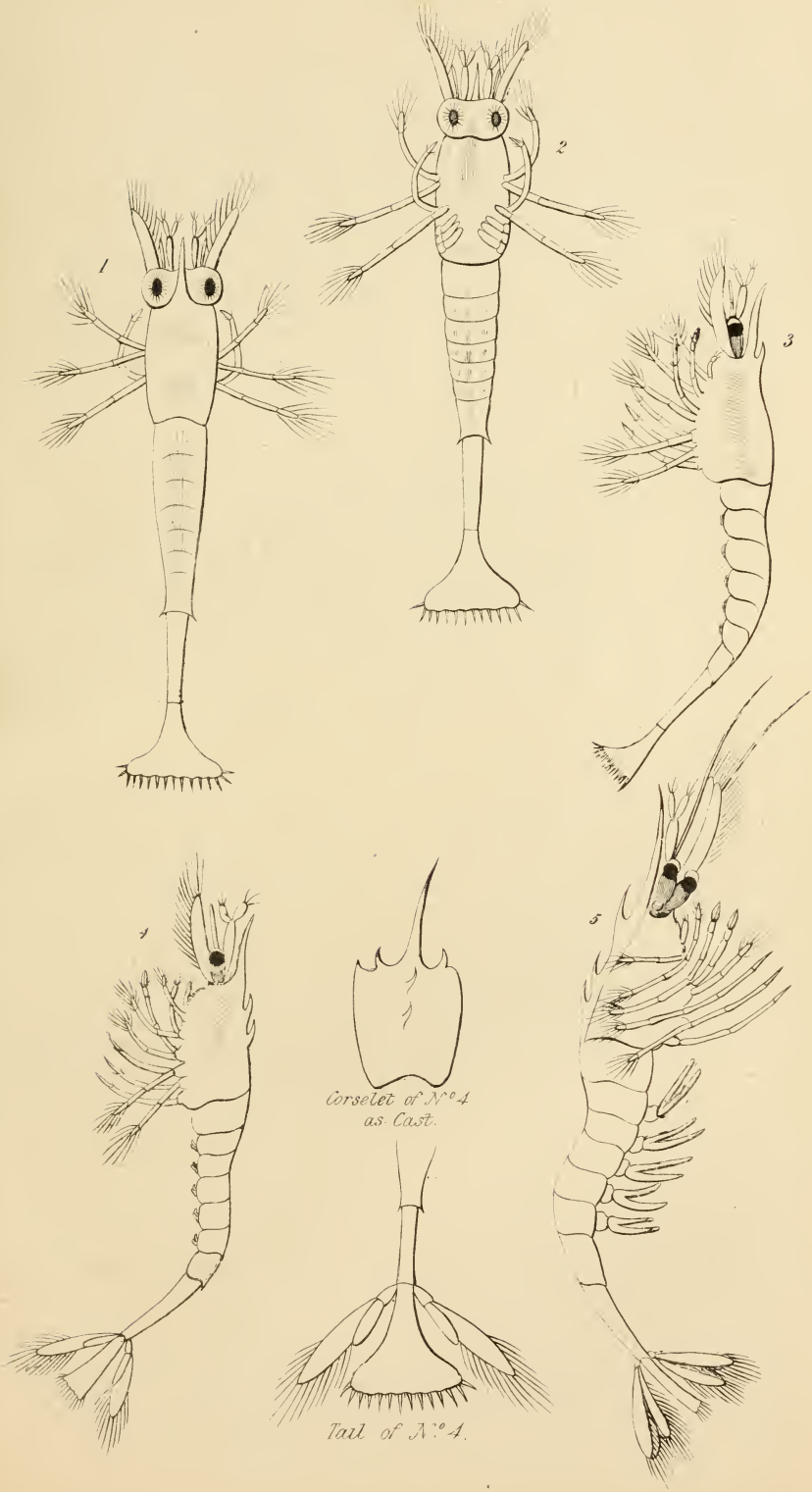
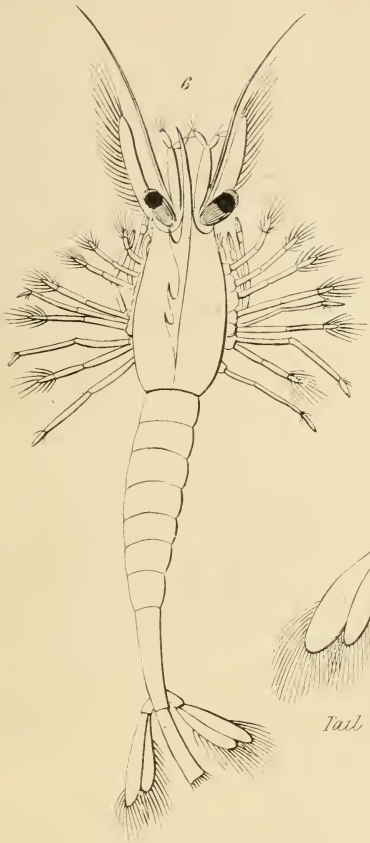
Acalypha ciliata

Larva of the Ditch Prawn. Palæmon variabile.

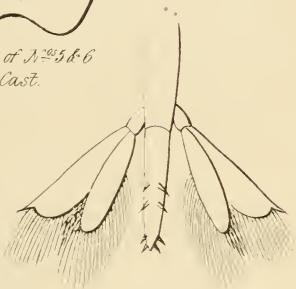


J. Basire lith.

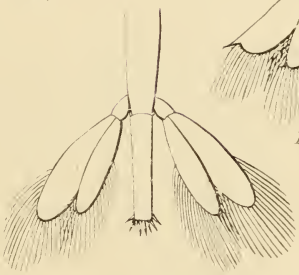
Larva of the Ditch Prawn Palaemon varians.



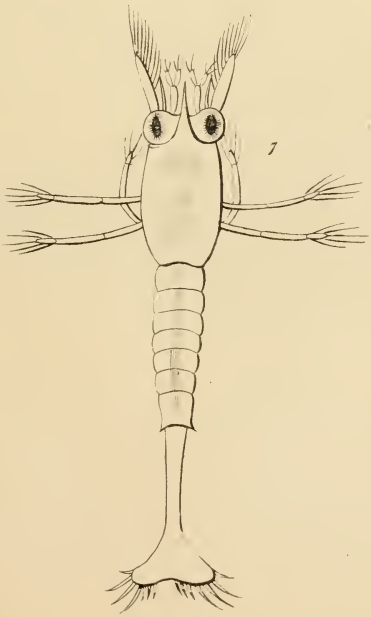
Corselet of Nos 5 & 6 as Cast.

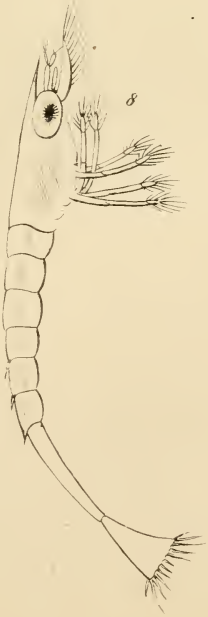


Tail of the Young Prawn.



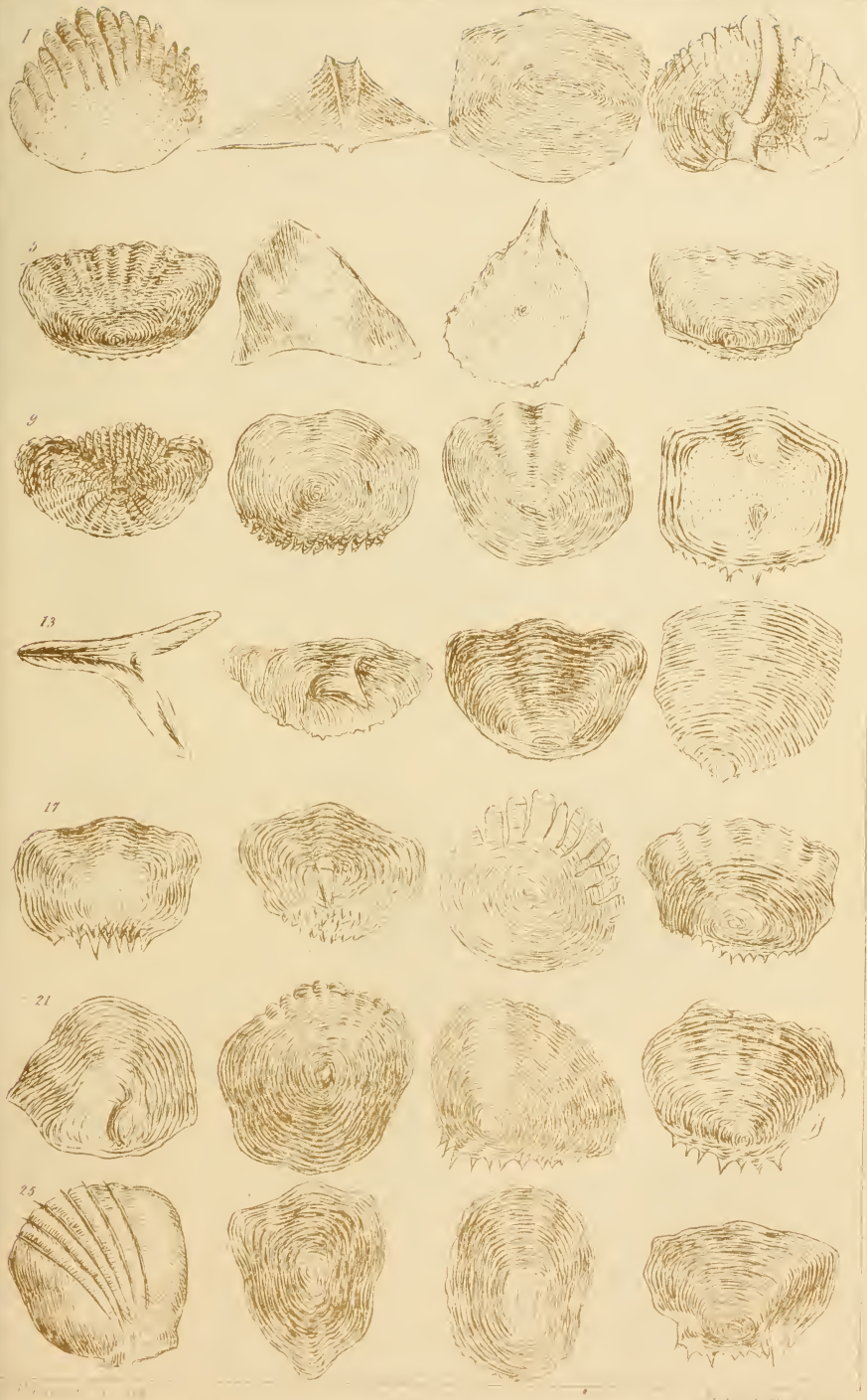
Tail of Nos 5 & 6





Larva of the Common Shrimp Crangon vulgaris.

J Basire, lith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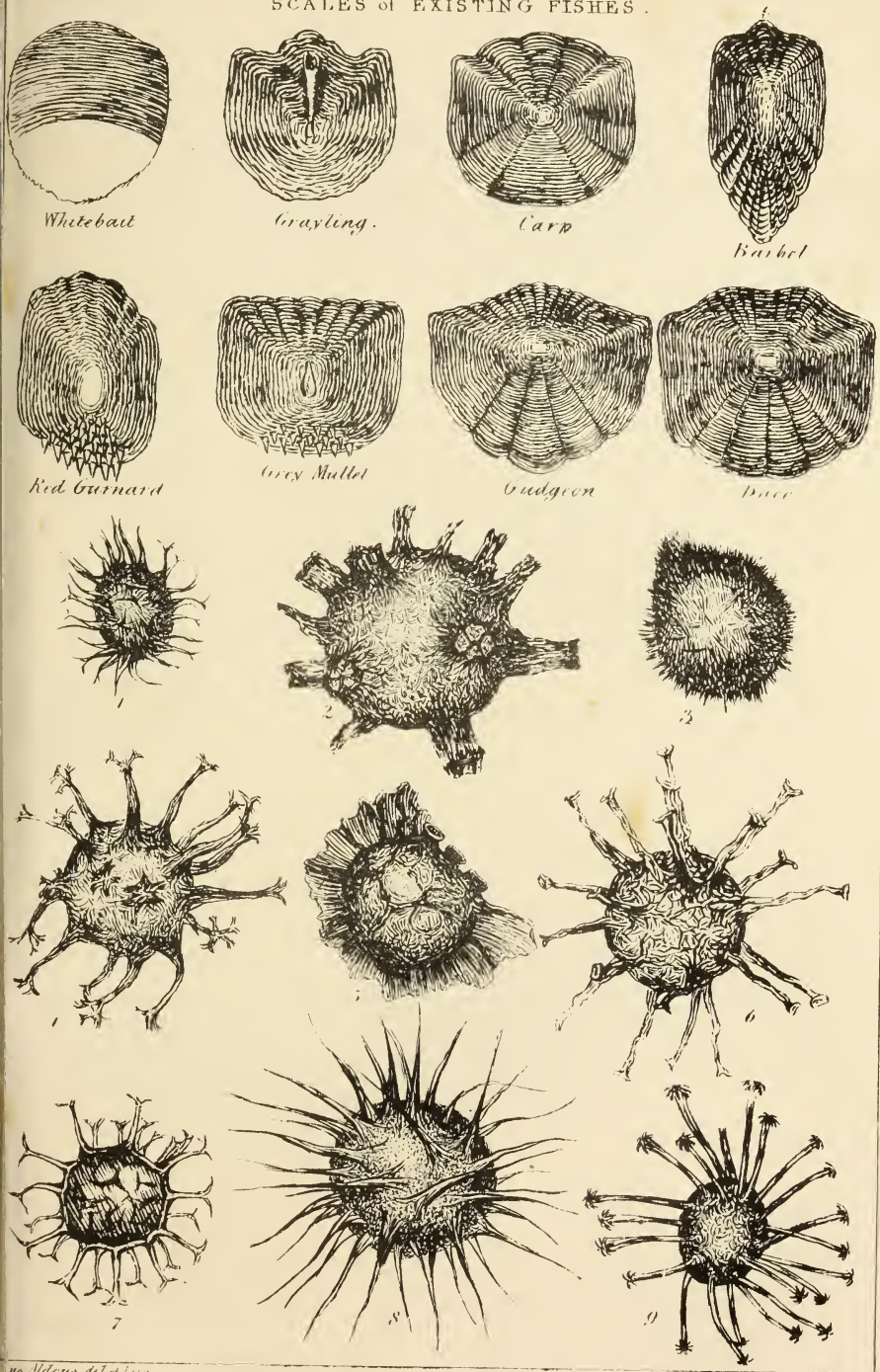
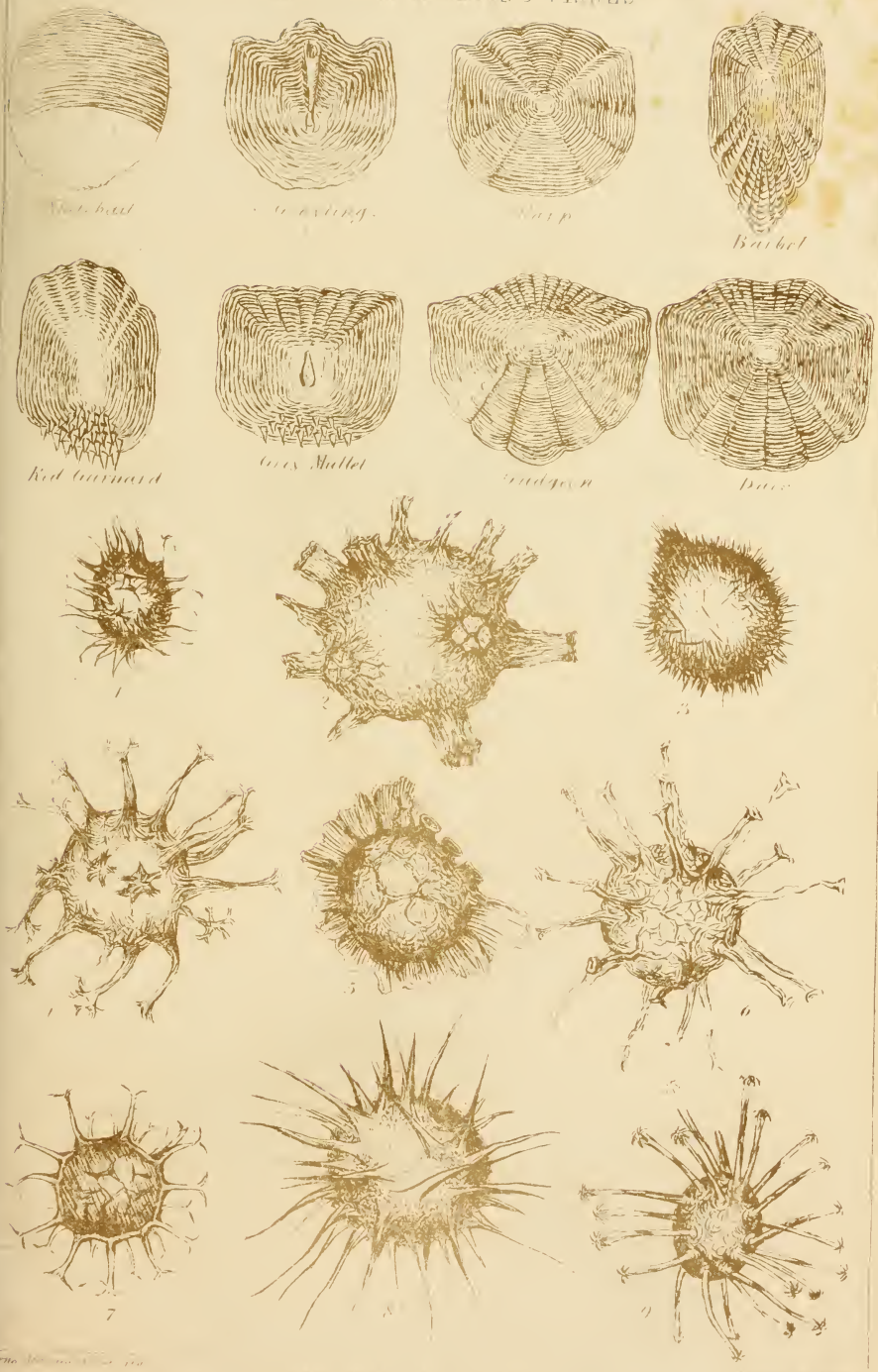
SCALES of EXISTING FISHES.



INFUSORIA IN FLINT.

1 Xanthidium furcatum _ 2. X crassipes _ 5. Do var _ 3. X. hirsutum _ 8 Do _ 4 X _ ramosum _ 7 Do _ 6 X tuberferum _ 9 Do

SCALES OF EXISTING FISHES



INTERSTITIAL [illegible]

1 Xanthidium furcatum 2 [illegible]

Feathers of Falco Islandicus *and* F. Græulandicus

A. Tail feather of Young Falco Islandicus
B. Primary of Mature do do
D. Lesser wing covert feather of do do
E. Primary of Mature Falco Grœnlandicus
F. Tail feather of Young do do
G. Covert feathers of Mature do do

Dorsal view of Vespertilio Leisleri.
½ the natural size.

J. Basire, lith.

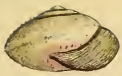
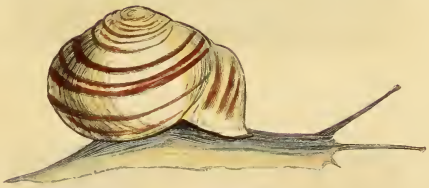


Fig. 3.

Fig. 2.

Fig. 1.

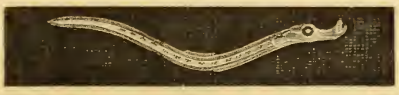


1. Helix Constantina. 2. H. Otthiana. 3. H. Roseo-tincta.

Forbes del.t

1 *Bulimus Terverii.*
2 *Achatina nitidissima.*
3 *Paludina Dupotetiana.*
4 *Pisiduim Lumstenianum.*
5 *Planorbis Metidjensis.*
6 *Pupa granum ?*

1



2

Metamorphosis of Syngnathus lumbriciformis.

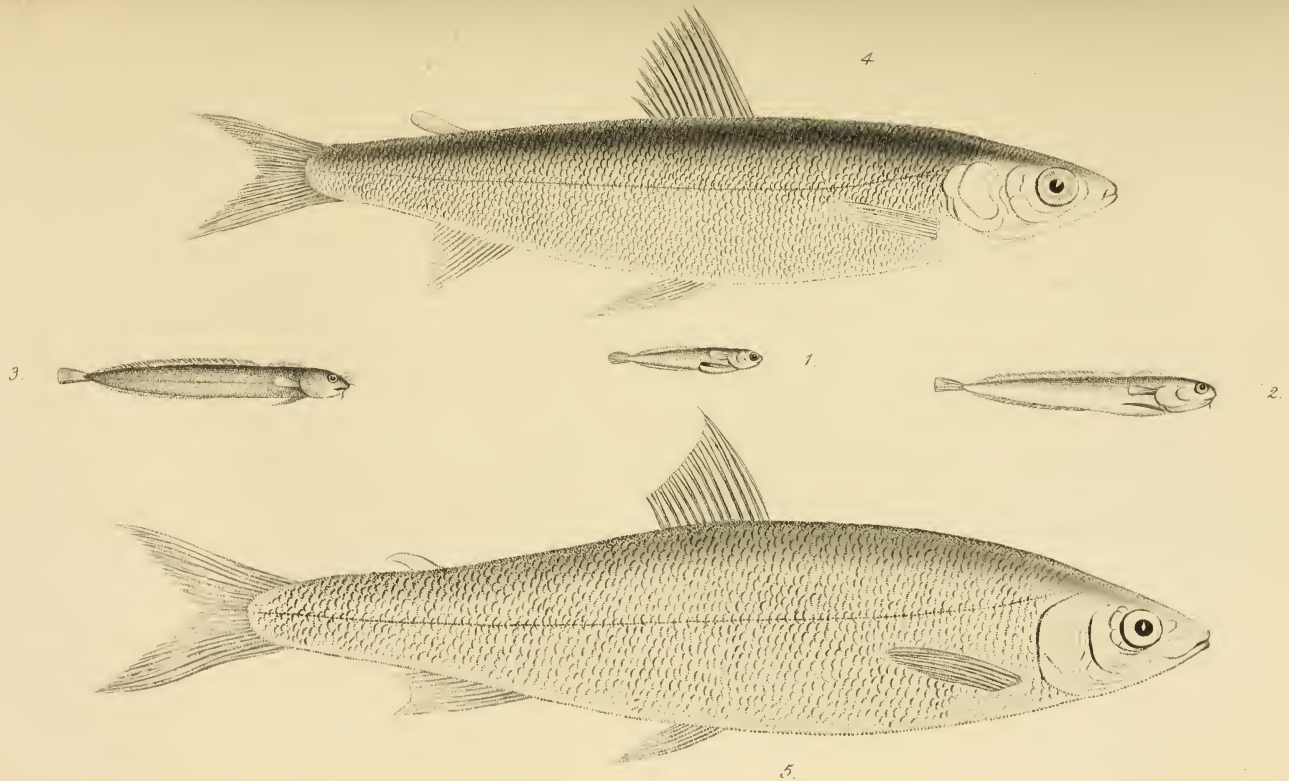
J. Basire sc.

BOS BRACHYCEROS. Gray.

F. Smith

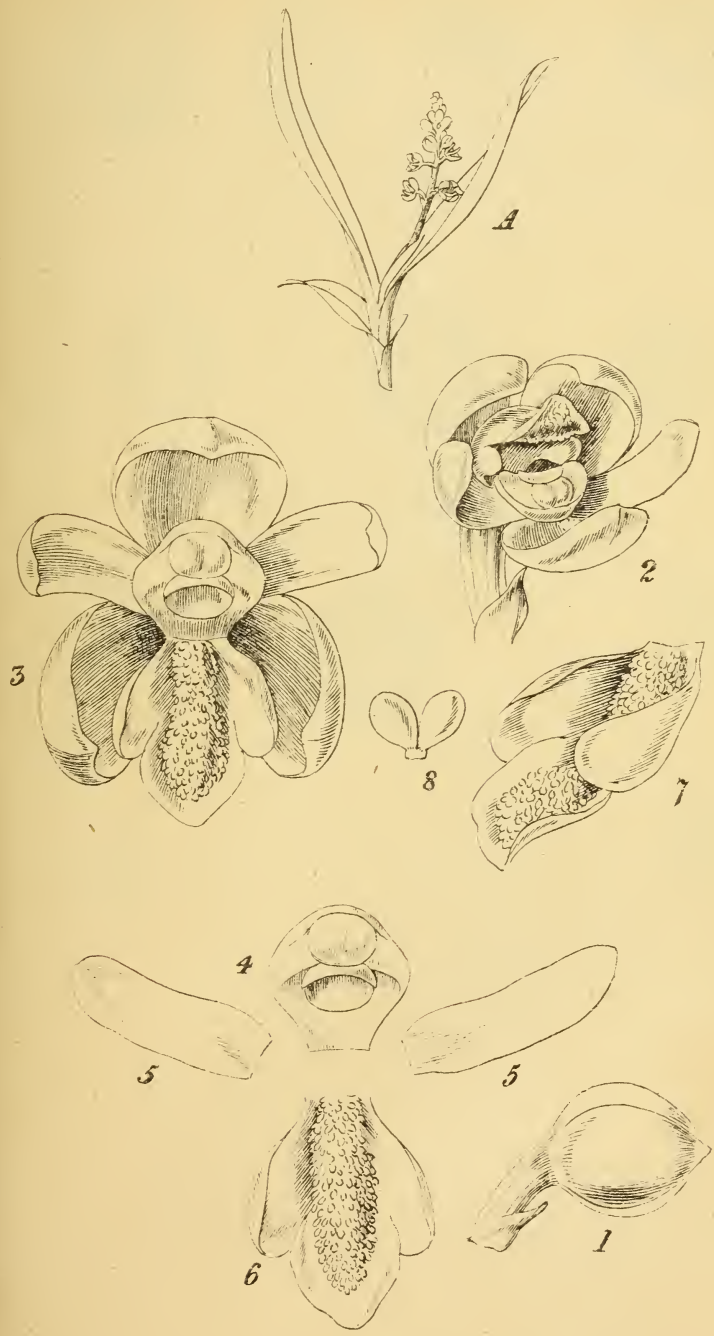
PTEROPAKA SANDACHII Gray

Pleurothallis aristata.



J. & J.C. J. del.t

J. Swaine sc.

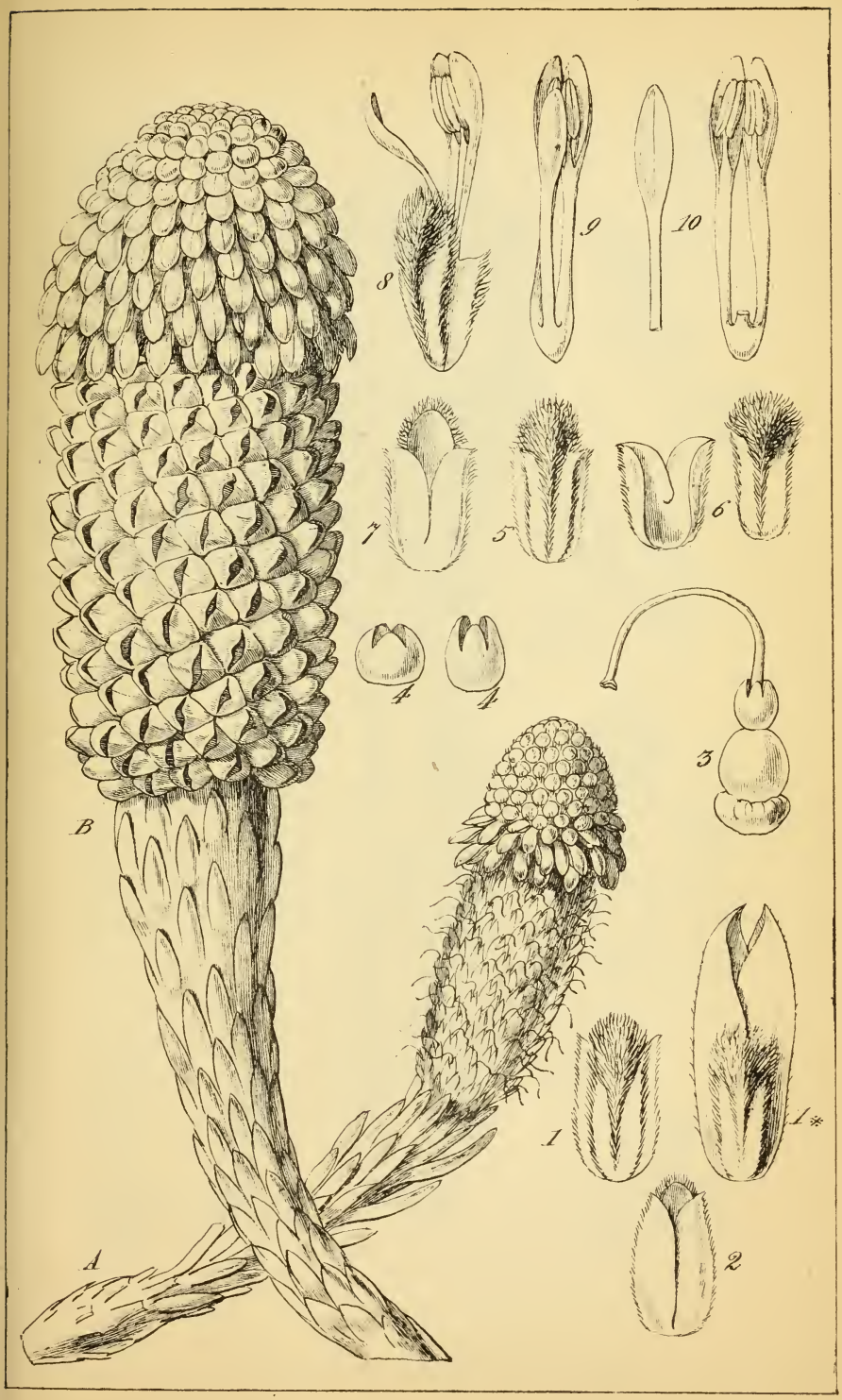


Stelis foliosa.

H. Grand, del.t

J. Basire, lith.

On the Structure of Pollen.



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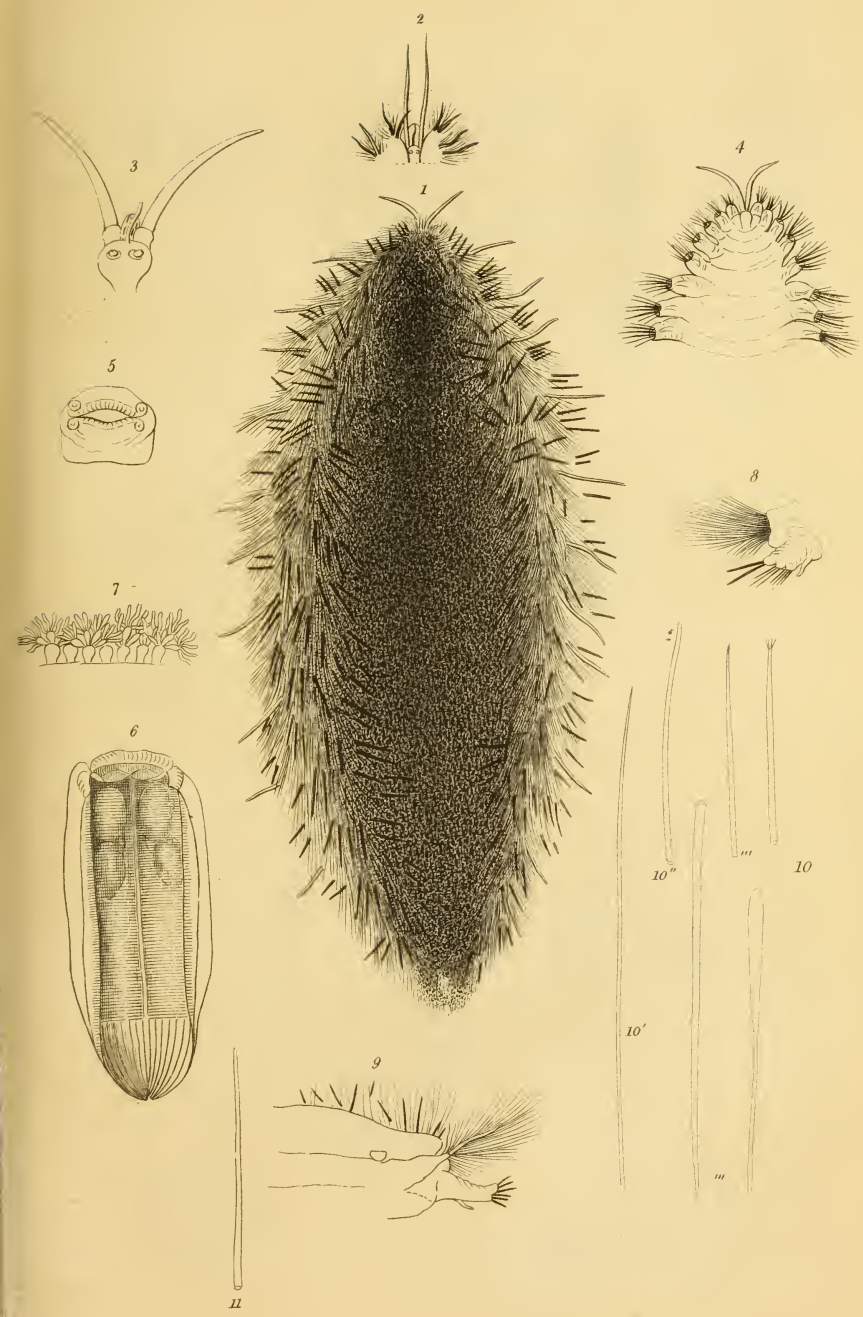

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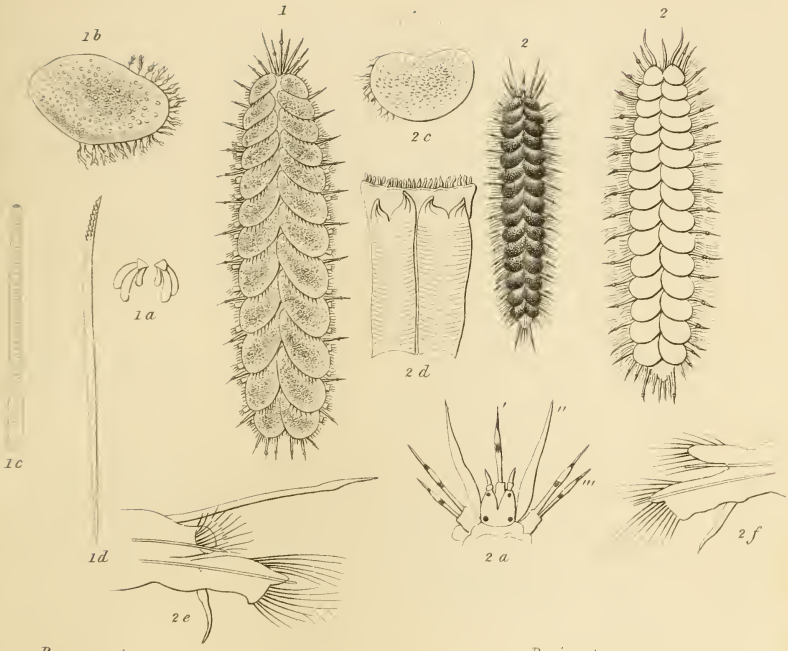

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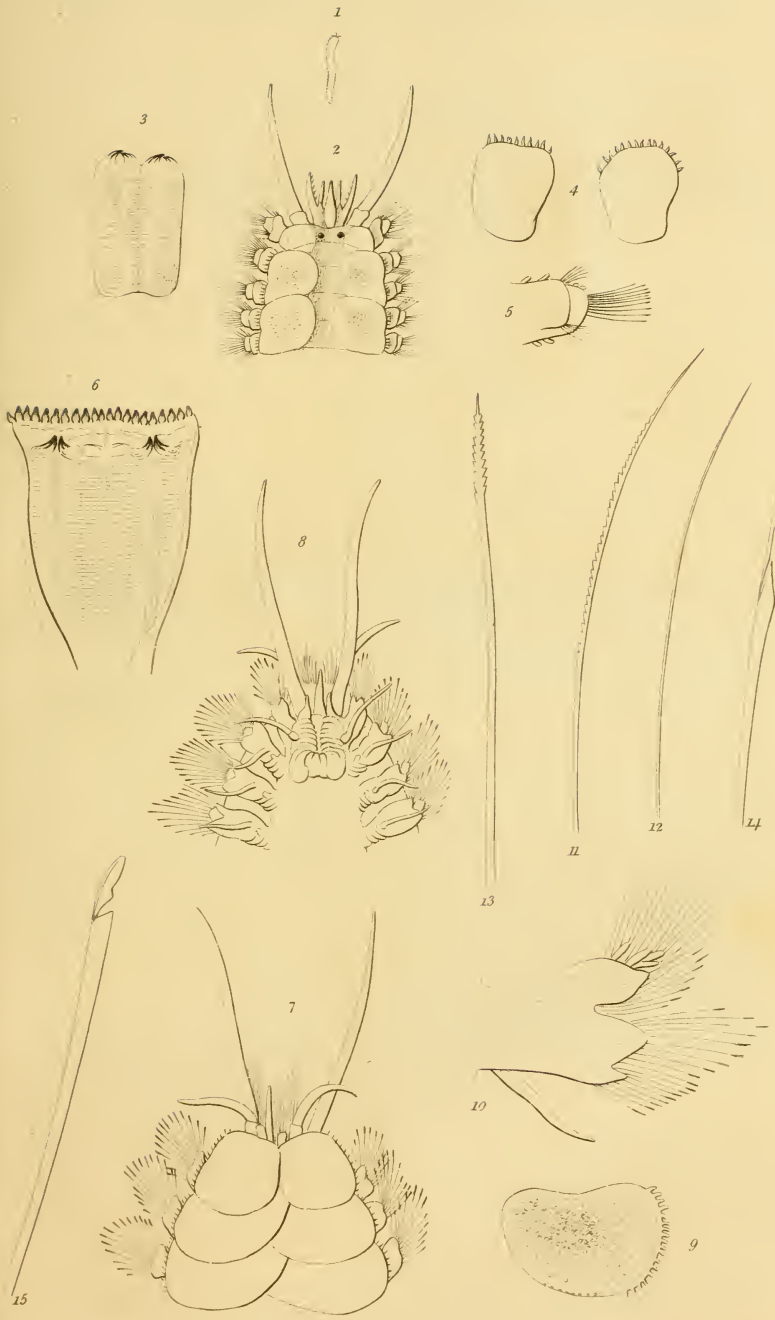

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coccíneus	*scarlet*		5 0
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1. * indicates such bulbs as are proper for glasses, pots, or the open borders. Those without a * are chiefly for pots or the open borders, yet Crocus and Tulips may be flowered on water. † are for open borders, ** for do., the frame, or green-house.

2. *Placing Hyacinths, &c. on Glasses.*—Insert the bulb so that the under surface be well covered with the water, but no more; fill up when necessary, and change the water once a week, or oftener if cloudy. Should the bulb become mouldy, the mould must be carefully wiped off with a soft cloth, which will prevent it from rotting. When the bulbs are well rooted they may be placed in a warm room, but not before.

3. *Planting Hyacinths, &c. in Pots.*—A mixture of good loam, sand, and very dry, old, rotten cow-dung forms the best compost for Hyacinths, P. Narcissus, Jonquils, &c., but they will succeed well on any moderately light soil. The bulb should be planted so that the upper surface is not entirely covered. Give little or no water at first, but increase the quantity as the bulb progresses. Care should be taken that the water does not enter the bud, otherwise the beauty of the flower will be endangered.

By degrees the bulbs may be exposed to the warmth of a drawing-room; but not till they are well rooted and begin to shoot out. If convenient, the pots, as soon as the bulbs are planted, may be plunged to the depth of 8 or 12 inches in the garden, and remain covered 6 or 8 weeks according to circumstances, which will enhance the beauty of the flowers. A little sand surrounding the root frequently prevents it from rotting.

4. *Planting Bulbs in the open Flower Borders.*—The compost above described is the best for Hyacinths, Narcissus, Jonquils, and some others; but they will all succeed very well in any good natural soil. Large bulbs may be planted 5 or 6 inches deep, and smaller from 3 to 4. Plant Hyacinths, Narcissus, and other large bulbs in rows about nine inches apart; but Crown Imperials and most of the Lilies require from 15 to 18 inches. For the smaller bulbs rows of 6 or 8 inches' width and the bulbs 4 to 6 apart, will be sufficient. October and November are the most proper months for planting bulbs, but they will succeed much later.

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* Beauté Brillante	1	3
* Boerhaave	0	9
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Bouquet Forau	1	0
Bouquet Royal	2	0
* Bouquet tendre or Waterloo	1	0
* Bridal Robe	0	9
Catherine la Victorieuse	4	0
* Comte de la Coste	2	0
* Comtesse de la Coste	1	6
Cramoisie Royale	0	9
* Delice de Flora	0	9
* Delice de Printems	0	9
* Diadem de Flora	0	9
* Diamond Mine	0	9
* Dido	0	6
* Duchesse de Brunswic	1	0
* Duchesse de Parme	0	6
* Eendract (Unity)	1	6
* Emilia Galotti	0	9
* Euterpe	0	9
* Flora's Rosenkranz	0	6
Flos sanguineus	1	6
Furius Camillus	1	0
Gloria Solis	2	0
* Gloriosa Superba	2	0
* Goudbeurs (Gold-purse)	2	0
* Grootvorst, very large	0	9
Henri Quatre	1	0
* Hersilia	1	0
* Hugo Grotius	0	6
* Il Pastor Fido	0	1
* Illustre Pyramidale	0	9
* Julia	1	0
* La Beauté Suprême	1	0
* Kaiser Leopold	0	9
* Lavater	0	9
* L'Aube du Jour	1	0
* La Beauté Suprême	1	6
* L'Engageante	1	0
* L'Honneur d'Amsterdam	1	6
* Lord Castlereagh	0	9
* Madame Zoutman	1	0
* Maria Louisa	1	3
* Marquis de la Coste	2	0
Marshal Blucher	0	9
* Moore	2	6
* Panorama	2	0
* Perruque Quarré	1	0
* Perruque Royale	2	0
Phœnix	0	9
* Prince of Roses	0	4
Queen Adelaide	2	0
Ravisante	3	6
* Regina Rubrorum	1	6
* Rex Rubrorum	2	0
* Rose Agréable	0	4
* Rose d'Ispahan	0	9
* Rose d'Hollande	0	9
* Rose Mignonne	0	4
* Rose Sceptre	0	9
* Rose Surpassante	0	9
Rouge Bleuatre	1	3
* Rouge Charmante	0	9
Rouge Joli	1	3
Rouge Pourpre et Noir	3	0
* Roxana	2	0
* Soleil Royal	2	0
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Keiser Titus	0	9
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Koning der Moren	1	0
* Kroon van Indien	1	0
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* L'Amitié	0	9
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* Nitrocris	0	9
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* Olden Barneveld	0	9
* Orondatus	2	0
Orpheus	0	9
* Porel Root	2	0
* Parmenio	1	6
Passe non plus l'Ultra	1	0
* Pasquin	1	0
* Passetout	0	9
* Perle Brillante	1	0
* Perle Pyramide	1	0
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Heroine	2	6
Jaune Neapolitaine	1	6
* Louis d'Or	0	9
* Ophir	[illegible]	[illegible]
* Pluie d'Or	2	0

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* Alamode	0	6
* Alamode Epuisée	0	9
Alcibiades	0	9
* Altesse Royale	0	9
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* Anna Maria, extra fine	0	9
Beauté Sanspareille	1	0
Belle Forme	0	9
* Berg Vesuvius	0	9
* Bijoux des Amateurs	0	6
* Blanche Fleure	0	9
Bouquet Aimable	1	0
* Bucentaurus	1	0
* Candidus Violaceus	0	1
Cœur Aimable	0	9
* Cœur noir	1	0
Constantia Elisabeth	1	0
* Couronne Blanche	0	9
* Dageraad	0	6
Diana d'Ephèse	1	0
* Don Gratuit	0	8
* Duc de Berri	1	0
* Duc de Valois	1	0
Duchesse de Bedford	0	9
Duchesse de Berri	1	0
* Dulcinea	1	0
* Eliza	3	0
* Francina	0	6
Furius Camillus	1	0
* Gloria Florum	1	0
Gloria Florum Suprema	3	0
* Grand Jewel of Haarlem	0	9
Grand Magnificence	0	6
Grand Monarque de France	2	0
Grafin von Wassenar	0	9
* Gulde Vryheid	0	9
* Hermau Lange	2	0
* Hermine	0	6
Heroine	2	6
* Hoofd	1	6
Illustre Beauté	1	0
* Jeannette	0	9
Josephus Secundus	1	3
* Keiser Leopold	0	9
King David	0	6
* Konigin Vastbe	0	9
La Chérie	0	9
* La Déesse	1	0
La Magnifique	0	9
Madame de St. Simon	1	6
* Margrave	1	0
Marmontel	0	9
* Mignonne de Delft	0	9
* Miss Kitty	2	0
* Montesquieu	1	0
* Nannette	0	6
* Og Roi de Bazan	1	6
* Passe Virgo	0	6
* Penelope	0	4
* Prince of Waterloo	3	0
Prince William Frederick	1	6
* Pyrène	2	0
* Rand van Staaten	0	9
* Reine de Prusse	2	0
Sceptre d'Or	1	0
* Sphæra Mundi	1	0
Sultan Achmet	1	0
* Triumph Blandina	1	0
* Venus	2	0
* Violet Superbe	1	0
* Virgo	0	9

SINGLE HYACINTHS.

SINGLE RED.

	s.	d.
* Acteur	0	6
* Actrice	0	9
* Aimable Rosette	0	6
* Belle Rosette	1	0
* Cardinal	0	9
* Catherina	0	9
* Cato	0	9
* Charlotte Marianne	1	0
* Cochenille	4	0
* Cornelia	2	6
* Cupido	0	9
* Diana	1	0
* Dorothea Wilhelmina	1	0
* Duchesse de Kent	2	6
* Duke of Wellington	1	0
* Elfrida	0	9
* Eclatante Parfaite	0	9
* Emilius	0	9
* Excellente	1	0
* Grand Maitre Royal	1	0
* Henrietta Wilhelmina	1	0
* Hersilia	2	6
* L'Amie du Cœur	2	0
* La Baleine, large	1	0
* La Belle Rose	1	0
* L'Eclair	3	6
* La Fortune	1	0
* La Modeste	0	9
* Lord Byron	2	0
* La Victoire	1	0
* Mars	3	0
* Monsieur de Faesh	3	0
* Oberon	2	6
* Paix d'Amiens	0	9
* Plaisir des Dames	1	0
* Princesse Wilhelmina	1	0
* Pronk Jewel	1	3
* Queen Victoria	3	0
* Rose Bouquet Aimable	0	6
* Rose Charmante	0	9
* Temple d'Apollon	1	0
* Thalia	0	9
* Theodora Wilhelmina	0	9
* Triumphe de l'Europe	1	0

SINGLE BLUE.

	s.	d.
* Alexander niger	0	6
* Appius	0	6
* Bishop Royal	0	9
* Buonaparte	1	6
* Camper	0	9
* Castor	0	9
* Crepuscule, dark	1	0
* Diocletian	0	9
* Dolphin	0	9
* Duchesse de Clarence	1	6
* Eleuthera	0	9
* General Blucher	2	0
* General Hoche	2	6
* Graaf van Buren	0	6
* Grand Vedette	[illegible]	6
* Haller	1	6
* Kaiserliche Purpur	0	9
* Kaiser Tiberius	0	6
* King's Mantle	1	0
* Kroon van Brabant	1	0
* L'Amie du Cœur	0	6
* Le Plus Noir	2	0
* Lord Grey	1	6
* Lord Nelson	0	6
* Lyra	0	6
* Madame de Vallière	1	6
* Mulciber	0	9
* Nimrod	1	0
* Oberon	2	0
* Orondates	0	9
* Pasha of Cairo	0	9
* Porcelaine Sceptre	0	9
* Pronk Jeweel	0	9
* States General	0	6
* Tubal Cain	2	0
* Vulcan	1	6

SINGLE YELLOW.

	s.	d.
* Adonia	0	6
* Adorable	0	9
* Alexius	0	9
* Aurora	0	9
* Couleur de Jonquille	0	9
* Couronne d'Oudan	0	9
* La Belle Jaune	0	9
* Louis d'Or	0	9
* Madame de Pompadour	0	9
* Plaisir des Dames	0	9
* Pluie d'Or	0	6
* Sceptre d'Or	0	9
* Toison d'Or	0	6

SINGLE WHITE.

	s.	d.
* Belle Galathé	0	6
* Belle Pomone	0	9
* Couronne Blanche	0	9
* Duc de Cumberland	0	6
* Grande Blanche Impériale	0	9
* Grand Vanqueur	1	0
* Grandeure Triomphante	0	6
* Hercules	1	3
* La Candeur	0	9
* Madame Turc	1	0
* Monarque du Monde	0	6
* Mont Blanc	0	9
* Overwinnaar	0	9
* Pigeon	0	[illegible]
* Premier Noble	0	6
* Prince de Palatzin	1	0
* Pronk Jewel	0	9
* Rhadamanthus	0	9
* States General	0	9
* Talleyrand (Madame)	2	0
* Thais	1	6
* Triumph Blandina	0	9
* Virgo	0	9
* Voltaire	1	6

FINE MIXED HYACINTHS IN SEPARATE COLOURS.

	Dozen. s.	d.
Double Red ....2s. 6d. to	3	6
Double Blue	3	6
Double White	3	6
Single Red	3	6
Single Blue	3	6
Single White	3	6

DOUBLE HYACINTHS IN ASSORTMENTS.

	s.	d.
* 25 Superfine named sorts...	40	0
* 12 Do. do. do. ...	20	0
* 25 Fine sorts do. ...	20	0
* 12 Do. do. do. ...	10	0
* 12 Good do. do. ...	7	0

SINGLE HYACINTHS IN ASSORTMENTS.

	s.	d.
* 25 Superfine sorts, named	40	0
* 12 Do. do. do. ...	20	0
* 25 Fine do. do. ...	20	0
* 12 Do. do. do. ...	10	0
* 12 Good do. do. ...	7	0

Narcissus Tazetta.

POLYANTHUS NARCISSUS.

a) PURE WHITE, OR WHITE WITH ORANGE OR YELLOW.

	Doz.	Each. s.	d.
* Razelman major, w.o.	10s.	1	0
* Bazelman minor, w.o.	6s.	0	6
* Blanc de Neige, pure wh.	6s.	0	6
* Bouquet Royal		0	6
* Grand Duke		0	6
* Grand Monarque, w.o.	1s.	0	4
* Grand Primo	3s.	0	4
* Jupiter		0	4
* Koning von Schweden		0	6
* Luna		0	6
* Medio lutea		0	4
* Monument		0	6
* Reine du Monde		0	6
* Snowball, pure white		0	6
* States General, white		0	1
* Van Rhyn		0	4
* Voilo		0	6
* Vreede		0	1
* Zilversink		0	6
* 12 Finest sorts, named		5	0

b) YELLOW, OR YELLOW WITH ORANGE.

	s.	d.
* Commissioner	0	4
* Concordia	0	6
* Goude Mund	0	4
* Goude Vlag	0	6
* Lord Mayor	0	6
* L'Imposante	0	6
* L'Or de Perou	0	6
* Lustre de Soleil	0	4
* Luteo	0	4
* Pythagoras	0	6
* Superbissima	0	6
* Soleil d'Or ....3s. doz.	0	3
* Van Gelder	0	6
* Veronica	0	4
* 12 finest sorts, named	5	0
* Finest white and yel. mixed	3	0

* Narcissus Italicus.

ITALIAN NARCISSUS.

	s.	d.
Fine Double Roman...3s. doz.	0	4
Paper White...........3s. doz.	0	4

Narcissus Jonquilla.

JONQUILS.

	s.	d.
Extra large double ...4s. doz.	0	4
Second size ......2s. 6d. doz.	0	3
Single or Campernelles 1s. 6d.	0	2

(See Miscellaneous Roots.)

Crocus Vernus, &c.

LARGEST DUTCH CROCUS.

	per 100. s.	d.
Blue	2	6
Purple	2	6
Striped	2	6
White	2	6
Cloth of Gold (susianus)	2	6
Cloth of Silver (biflorus?)	2	6
Aut. or Saffron (sativus)	2	6
Yellow (luteus)	2	6
Var. coloured (versicolor)	2	6
Smaller Dutch sorts	1	6
25 fine named sorts	4	0
Finest mixed Dutch	2	0
Finest mixed new Seedlings	3	6

Tulipa Gesneriana, var.

EARLY TULIPS.

	Dozen. s.	d.
Claramond	4	0
Duc van Tholl	1	0
Duc van Tholl, yellow, each 1s.		
Duc van Tholl, white, each 1s.		
Jaune Rouge	2	6
Ma Plus Aimable	2	6
Pottebacker, yellow	4	0
Pottebacker, red	5	0
Standard	4	0
Yellow Prince	3	0
White and red Border	2	6
25 fine, named	10	0
Very fine mixed, per 100, 10s.	1	6
Good do., — 7s. 6d.	1	0

DOUBLE TULIPS.

	s.	d.
Duc van Tholl	1	0
Marriage de ma Fille	7	0
Rex Rubrorum	2	0
Tournesol	2	0
25 fine, named ....10s.	5	0

† LATE TULIPS.

These and the Parrot Tulips are for the Flower-Borders only.

	Dozen. s.	d.
Extra fine Biblœmen, Bisards, and Roses, mixed, 100, 20s.	3	0
Good Border Varieties ...10s.	1	6
Fine named sorts from 1s. each.		

† MONSTREUSE TULIPS.

	s.	d.
Constantinople	2	0
Luteo Rubro	2	0
Margrave	2	0
Perfecta	2	0
Luteo variegata	2	0
Finest mixed	1	6

The following Bulbs marked † are for the flower-borders only, except Anemones and Ranunculus, which are sometimes grown in pots.

Iris Xiphioides.

† ENGLISH IRIS.

	s.	d.
50 Splendid varieties	50	0
12 Do. do.	12	0
12 Fine do.	1	0
Fine Bronze ....per doz.	12	0
Fine new spotted	18	0
Extra fine mixed	7	0

Iris Xiphium.

† SPANISH IRIS.

	Dozen. s.	d.
25 Fine, named	5	0
12 Do. do.	2	6

	Dozen. s.	d.
Extra fine, mixed	2	0
Fine do.	1	0

† Lilium Martagon.

MARTAGONS, RED.

	Each. s.	d.
King's Crown	1	0
Jupiter	0	9
La Couronne Rouge	1	0
Rhinoceros	0	9
Romanum	0	9
Rouge Joli	1	0
Rouge Magnifique	1	0
Rubro Imperialis	1	0

MARTAGONS, YELLOW.

	s.	d.
Goliath	0	9
Golden Crown	0	9
Grand Prince	1	0
Grand Hero	1	0

MARTAGONS, WHITE.

	s.	d.
Henri le Grand	1	6
Madame Blanche	1	0
Pigeon	1	0
Voltaire	1	0

MARTAGONS, PURPLE.

	s.	d.
Brunette Aimable	0	9
Brunette Royale	0	9
Hamilcar	1	0
Pallas	0	9
Themistocles	0	9
Standard	1	0

MARTAGONS IN ASSORTMENTS.

	Dozen. s.	d.
12 Fine named sorts in 1 col.	8	0
Fine mixed varieties	1	0

Fritillaria Imperialis.

† CROWN IMPERIALS.

	Each. s.	d.
Aurora	0	9
Goliath	1	0
Kroon op Kroon	1	0
Maximus, red	1	0
Maximus, yellow	1	0
Miniature	0	9
Orange Crown	0	9
Orange Sulphureo	1	0
Roman Emperor	0	9
Slagzwaard	0	9
Sultan	1	0
William Rex	0	9
12 var., one of each	8	0
Fine mixed ....dozen	6	0

Anemone Coronaria.

† POPPY, OR GARLAND, ANEMONE.

	s.	d.
100 finest new double varieties, nearly the size of Pæonies, at 110s. per 100		
12 Do. do. do.	14	0
12 Very fine do. do.	12	0
Fine mixed do. do. ...dozen	5	0
Fine double mixed, usual size ......lb.	16	0
Finest single mixed.........lb.	4	0

IN SEPARATE COLOURS.

	Dozen. s.	d.
Apennina, blue	4	0
Azur Incomparable	5	0
Couleur de Sang, red	5	0
Peu Superbe	3	6
Lord High Admiral, scar.	5	0
Josephina	5	0
Igneo, flame	4	0
Rose Surpassante	[illegible]	[illegible]
Fine Scarlet..............lb.	20	0
The above 8 var., one of each	5	0

Anemone Hortensis.

† STAR-FLOWERED ANEMONE.

	Dozen. s.	d.
Double Red	3	6
Single Red	3	6
Purple	3	6
Rose	3	6
12 in 6 var. separate	5	0

Ranunculus Asiaticus.

† ASIATIC RANUNCULUS.

	s.	d.
Fine double, named, 100, 25 to	40	0
Fine do. do. Scotch...doz.	12	0
Extra fine, mixed 100	15	0
Fine do. 100	5	0

R. Asiaticus, var.

† TURBAN RANUNCULUS.

	100.	Doz. s.	d.
Scarlet, or Sanguineum...	4s.	0	6
Yellow	5s.	0	9
Orange, or Turban d'Or		2	0
Black or dark		2	0
New white		7	6
Mixed Turban	4s.	0	6

Anemones and Ranunculus if planted in Autumn require a warm sheltered situation: they are generally planted in April.

Polianthes Tuberosa.

TUBEROSES.

	Dozen. s.	d.
Fine large double Italian	4	0
Second Size	3	0

Tuberoses are generally planted in Spring, commonly on a hot-bed; though they succeed in a sheltered situation in the open ground, if properly treated.

MISCELLANEOUS ROOTS.

Those marked ** are proper either for Pots or the open Flower-Borders; the others for the latter only.

		Doz. s.	d.	per 100. s.	d.
Colchicum autumnale	*Autumnal Colchicum*	2	0		
var. flore-pleno	*Double do. do.*	3	0		
Cyclamen persicum	*Persian Cyclamen*	15	0		
repandum	*Repand*	15	0		
** Eranthis hyemalis	*Winter Aconites, yellow*	1	0	6	0
Erythronium Dens-canis	*Dog-tooth Violets, red*	1	6		
var. purpureum	*Purple do. do.*	1	6		
albiflorum	*White do. do.*	3	0		
Fritillaria Meleagris	*Guinea-fowl Frit. mixed*	1	6		
** Galanthus nivalis	*Snowdrops, double*	0	1	2	6
Gladiolus communis	*Com. pur. Sword-Flag*	1	0		
var. albus	*White do. do.*	3	0		
byzantinus	*Constantinople do.*	1	6		
psyttacinus	*Parrot-striped do.*	2	6		
Iris susiana	*Susian Iris, 1s. each*	10	0		
** persica	*Persian do., 3d. each*	2	6		
Leucojum æstivum	*Summer Snowflake*	2	6		
vernum	*Spring do.*	6	0		
Lilium candidum	*White Lily (large)*	3	6		
var. flore-pleno	*Double do. do.*	6	0		
bulbiferum	*Bulb-bearing (Orange)*	4	6		
** japonicum	*Japan, 2s. 6d. each*	27	6		
** longiflorum	*Long-flowered, 2s. each*	20	0		
superbum	*Superb, 1s. 6d. each*	15	0		
Muscari moschatum	*Musk Hyacinths*	5	0		
botryoides	*Grape do.*	2	0		
comosum	*Feathered do.*	3	0		
Narcissus albus	*White Narcissus*	0	9		
var. flore-pleno	*Double do. do.*	1	0		
— incomparabilis	*Incomparable do.*	1	0		
— aurantius	*Orange (Phœnix) do.*	1	6		
— sulphureus	*Sulphur (Crown)*	1	6		
— [illegible]	*Beautiful*	2	6		
biflorus	*Two-flowered*	0	9	5	0
** Bulbocodium	*Hoop Petticoat, extra*	5	0		
poeticus	*Pheasant's-eyed Narcissus*	0	6	4	0
** Ornithogalum arabicum	*Arabian Ornithogalum*	16	0	1	6
Pavonia tigridia	*Striped Pavonia*	2	6		
conchiflora	*Shell-flowered do.*	6	0		
Scilla campanulata	*Bell-flowered Squill*	2	0		
var. alba	*White do. do.*	2	0		
præcox	*Early-flowered*	12	0		
peruviana	*Peruvian, &c. &c.*	10	0		
** Tulipa sp. suaveolens	*Sweet-scented Tulip*	1	0		
oculus solis	*Sun's-eye do.*	12	0		
** Trichonema Bulbocodium	*(Early red Ixia)*	2	6		

Cape Bulbs

Should be planted 4 to 6 inches deep, according to size of bulb, in a light sandy soil, in a sheltered situation; where they will flower luxuriantly in the open borders. They require the protection of dry litter in winter. When planted in pots 3 are sufficient for one pot, which may be kept in a cold Frame or Greenhouse.

		Doz. s.	d.	Each. s.	d.
Anomatheca cruenta	*Dark red Anomatheca*	3	0	0	1
Antholyza æthiopica	*Æthiopian A.*	7	0	0	8
coccinea	*Scarlet*	18	0	1	6
Babiana pl. sp.	*Several species separate*	18	0	1	6
— — —	*Fine mixed*	10	0	1	0
Cyanella capensis	*Cape Cyanella*			1	6
Ferraria undulata	*Undulated Ferraria*			1	6
Gladiolus cardinalis	*Scarlet st. Gladiolus*	5	0	0	6
floribundus	*Bunch-flowered do. extra*	12	0	1	0
hastatus	*Hastate*			1	6
hirsutus	*Hirsute*			1	6
præcox	*Early-flowered*			1	0
racemosus	*Branching, extra*			20	0
roseus	*Roseate*			1	6
trimaculatus	*Three-spotted*			1	6
Hypoxis aquatica	*Aquatic Hypoxis*			1	6
stellata	*Star-flowered do.*			1	0
Ixia aulica	*Courtly Ixia*	5	0	0	6
columellaris	*Pillar do.*	10	0	1	0
crateroides	*Crater-like (scarlet) do.*	7	0	0	8
maculata	*Spotted do.*	4	0	0	4
longiflora	*Long-flowered do.*	3	0	0	4
— var. fusca	*Buff do.*	3	0	0	4
viridiflora	*Green-flowered, extra*	5	0	0	6
Lapeyrousia falcata	*Sickle-shaped Lapeyrousia*			1	0
corymbosa	*Corymbus-flowered do.*			1	0
Lachenalia flava	*Yellow Lachenalia*			0	6
hyacinthoides	*Hyacinth-like do.*			1	0
Moræa edulis	*Eatable Moræa*			1	6
papilionacea	*Butterfly do.*			2	0
viscaria	*Viscous do.*			1	6
Sparaxis tricolor	*Three-coloured Sparaxis*	3	0	0	4
anemonæflora	*Anemone-flowered*			1	6
grandiflora	*Large-flowered*	4	0	0	4
var. alba	*White*	4	0	0	4
— purpurea	*Purple-flowered*			1	0
— variegata	*Variegated, &c. &c.*	1	0	0	4
— nova sp.	*New Seedlings*	7	0	0	6
Synnotia galeata	*Helmeted Synnotia*			1	6
Tritonia crocata	*Orange-flowered Ixia, &c. &c.*	4	0	0	4
Vieusseuxia glaucopis	*(Peacock Ixia)*	4	0	0	4
tricuspis	*Three-pointed*			1	6
Watsonia coccinea	*Scarlet Watsonia*			2	0
Meriana	*Merian's do.*	10	0	1	0
Wachendorfia hirsuta	*Hairy Wachendorfia*			1	6
paniculata	*Panicled do.*			1	6
sp. nova	*New species*			1	6

. *Three Roots may be had at the price per Dozen.*

Amaryllideæ.

Those marked † are hardy; others require a Frame or Greenhouse.

		Doz. s.	d.	Root. s.	d.
Amaryllis aulica	*Amaryllis, courtly*			5	0
aurea	*golden*			5	0
† Bella-donna	*Bella Donna*	8	0	0	9
crocata	*orange*			5	0
† formosissima	*Jacobæan Lily*	6	0	0	6
Johnsoni	*Johnson's*			3	6
† longifolia	*long-leaved*			1	6
psittacina	*Parrot*			7	0
revoluta	*revolute*			4	0
reginæ	*Queen's*			5	0
reticulata	*netted*			7	0
speciosa	*showy (scarlet)*			4	0
vittata	*ribboned*			3	6
var. hybrida	*splendid hybrids, var.*	80	0	7	6
Brunsvigia falcata	*sickle-leaved*			7	0
multiflora	*many-flowered*			7	6
— var. nova	*new var. do.*			7	6
toxicaria	*Poison-Bulb*			3	6
Josephinæ	*Josephine's*			21	0
Hæmanthus tigrinus	*Hæmanthus, striped*			4	0
coccineus	*scarlet*			5	0
Nerine undulata	*Nerine, undulated*			1	0
sarniensis	*Guernsey Lily*	7	0	0	8
† Sternbergia lutea	*Yellow autumnal Amar.*	3	0	0	4
† Zephyranthes candidus	*White Zephyranthes*	3	0	0	4
and many others.					

SUNDRY PLANTS.

	s.	d.
Beautiful Heartsease, comprising Victoria and other new sorts	17	6
Extra fine Pinks, all prize flowers ......per dozen pair	10	0
Superb Yellow and White Picotees......6 of each; per do. do.	40	0
Extra fine double Carnations in great variety ......do. do.	30	0

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